DOMESTIC ENGINEERING

VOL. 26. NO. 1. Chicago OCTOBER TWENTY-FOURTH, NINETEEN HUNDRED AND THREE New York WHOLE NO. 168

NEW YORK, BOSTON, MINNEAPOLIS, DENVER PHILADELPHIA, ST. LOUIS, LONDON, HAMBURG **AMERICAN RADIATOR CO.** GENERAL OFFICES LAKE & DEARBORN STS. CHICAGO.

CROSBY STEAM GAGE AND VALVE CO. Boston. New York Chicago

LEAK-PROOF SPRING-SEAT GLOBE and ANGLE **VALVES** All Parts Interchangeable All Parts Renewable Tested for Highest Pressures

CROSBY STEAM GAGE & VALVE CO. BOSTON. NEW YORK. CHICAGO.

FOR 25 YEARS The World Has Known the Excellence of Crosby Steam Appliances, None so Efficient and Durable. Design and Workmanship Unrivalled

WE. TWO ARE TRUE

IF MADE BY

GLAUBER BRASS MFG. CO.

Cleveland, O.

OHIO STATE UNIVERSITY.

E. W. BLATCHFORD & CO. CHICAGO. REPUTATION. ESTB. 1854 INCO. 1890 A TOWER of STRENGTH.

SEE OUR ADVERTISEMENT....Page 11.

WHAT A DIFFERENCE

In the quality of Plumbing work.

RAYMOND'S

COMBINATION FERRULES MAKE RELIABLE CONNECTIONS BETWEEN LEAD AND IRON PIPES.

WHY?

Because they have an extra thickness of lead over the shoulder, giving strength where it is needed, and where other Lead Ferrules are weak.

The genuine article bears our label.

RAYMOND LEAD COMPANY, CHICAGO.

The Flexible Metallic Gas Tubing

HYDRA

Will last a life time.
Will not leak.
Is guaranteed fire-proof.
Is neat, light and flexible.
Will not kink, and always retains full gas opening.

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JENKINS' IMPROVED AUTOMATIC AIR VALVES

Suitable for high or low pressure. Takes no more room than ordinary air cock. Endorsed by the leading steam experts as the best made and the quickest working. All genuine stamped with our Trade Mark.

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WALWORTH M'F'G CO. TOOLS and SUPPLIES for STEAM WATER and GAS USERS BOSTON MASS.

BOSTON, 128-136 FEDERAL ST.

Walmanco Pipe Joints.

FOR HIGH PRESSURE PLANTS.

No Threads. No Rivets. Flanges Swivel. Pipe sizes up to 24 in.

For Complete List of

PIPE FITTERS' TOOLS

Write for Blue Book A.

NEW YORK, PARK ROW BLDG.

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GOBEILLE PATTERN CO. Cleveland, O.

ARE YOU READING

the series of articles on "Determination of costs" in Weekly DOMESTIC ENGINEERING?

USE A RED CROSS FILTER AND BE HEALTHY — FILTER

Our New Catalogue

tells you all about automatic flushing and cooling,-the new principle of domestic filtration, as embodied in the

RED CROSS FILTER

Plumbers are coining money installing Red Cross Filters. Sit right down and send for catalogue.

METROPOLITAN FILTER COMPANY
163 WASHINGTON ST., CHICAGO, ILLINOIS

THE PATTERN SHOP OF THE EAST
H. B. OLMSTEAD CO., 87 Frankfort St., NEW YORK

F. E. Cudell's TRAP

Sewer Gas & Backwater (Patented)

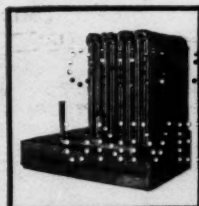
FOR Wash Bowls, Sinks, Bath and Wash Tubs.

$4 $5 $6 R. B.

Put into the White House by the United States government.

For Venting use Vent Trap

Cleveland, O.



"ABC"

FAN H. V. SYSTEM

FANS AND BLOWERS FOR ALL USES

AMERICAN BLOWER CO. DETROIT.

NEW YORK CHICAGO LONDON

PATTERNS

OF EVERY DESCRIPTION

PENN PATTERN WORKS, CHESTER, PA.

THE GREAT CHURCH LIGHT IS MADE TO fit all conditions. All styles from the plainest to the most elaborate. All we know about church lighting is yours on request.

I. P. FRINK, 551 Pearl St., NEW YORK

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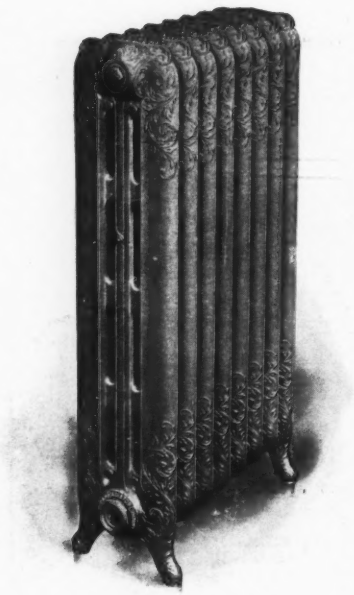
The Wide-Awake Policy.

The wide-awake stores and shops which supply the needs of humanity most fully—most harmoniously, gain the largest fruitage.

It's no matter of luck, or chance,—just best of goods and best of service.



The New Premier.

For heating needs the Dealer is very much assisted in securing fruitage by using **IDEAL** Boilers and **AMERICAN** Radiators.

IDEAL Boilers
AMERICAN Radiators

AMERICAN RADIATOR COMPANY

Lake and Dearborn Streets, Chicago

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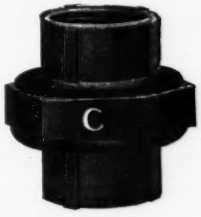
CRANE FITTINGS

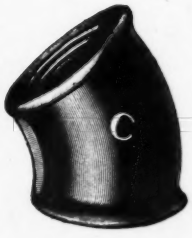
IN MALLEABLE, CAST IRON AND BRASS

CRANE CO. CLAIMS NOT ONLY TO MAKE A LARGER NUMBER AND VARIETY OF FITTINGS THAN ANY OTHER MANUFACTURER, BUT ALSO TO CARRY A LARGER STOCK. ALL ARE THREADED TO A UNIFORM GAUGE. CRANE FITTINGS ARE MARKED WITH A "C"

WRITE FOR COMPLETE POCKET CATALOGUE



MALLEABLE IRON AND BRASS PATTERNS



CRANE CO.

CHICAGO

ESTABLISHED 1855

NEW YORK
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SEATTLE
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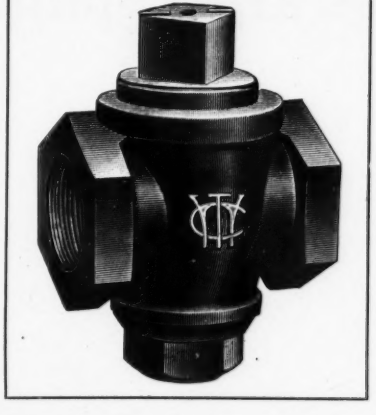

Iron Cocks

Improved Design, combining added strength, larger plug with opening full area of pipe, wide bearing to withstand heavy pressures.

Western Tube Company

Factory and General Offices: KEWANEE, ILL.

Branch Offices: CHICAGO, ST. LOUIS, NEW YORK, MINNEAPOLIS, SAN FRANCISCO

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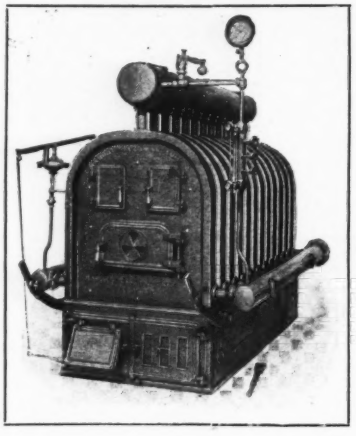
MAHONY BOILERS



EMBODY

All the Best Features

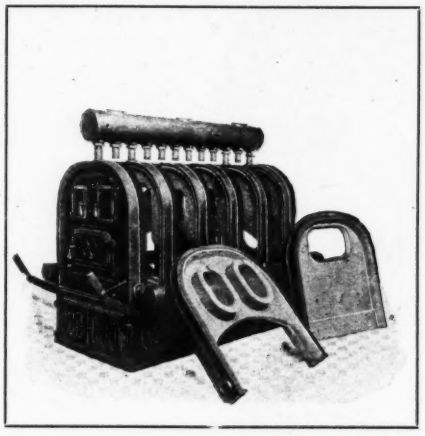
IN BOILER CONSTRUCTION

They are the intelligent outgrowth of many years of practical experience.

The Mahony Vertical Section Boilers

are dependable. Large effective heating surface, in direct contact, and straight waterways, vertical throughout, make it easy for a Mahony Sectional to deliver

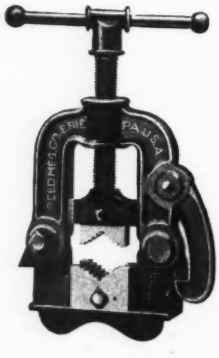
Hot Water or Steam up to the Full Rating



Our Catalogue tells all about them briefly and entertainingly.
IT'S YOURS FOR THE ASKING.

Mahony Mfg. Co., Manufacturers, Troy, N.Y.

Reed's Self-Locking Vises are Popular,

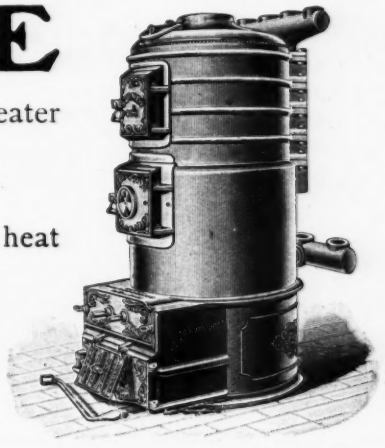


BECAUSE THEY ARE BUILT TO LAST.

The base of this vise has lugs on both sides so that the latch may be used on either side by simply reversing the yoke. It is simple in construction and unlocks instantly. The very best of material and skilled labor are used in the manufacture of these vises. The screws are made of all muck bar and the jaws are milled from tool steel and hardened in oil. All parts interchangeable. Every vise is sold under an absolute guarantee. Send for our catalogue "D" describing our Plumbers' and Steamfitters' Tools.

Reed Manufacturing Co., - Erie, Penna.

ALL INCLUSIVE



You're in a position to know what people demand in heater construction. Do they seek economy in operation?

You Have It In "Gurney" Heaters.

Do they seek exceptional efficiency,—the greatest heat from the fuel consumed?

"Gurney" Heaters are Famous in that Respect.

Do they seek durability, that feature which actually reduces cost of the heater?

"Gurney" Heaters Wear Longer Than Others.

Add to all this the fact that "Gurney" Heaters are simple in construction, easy to operate and no more expensive than many inferior makes, and you know why they prove the strongest trade attractions.

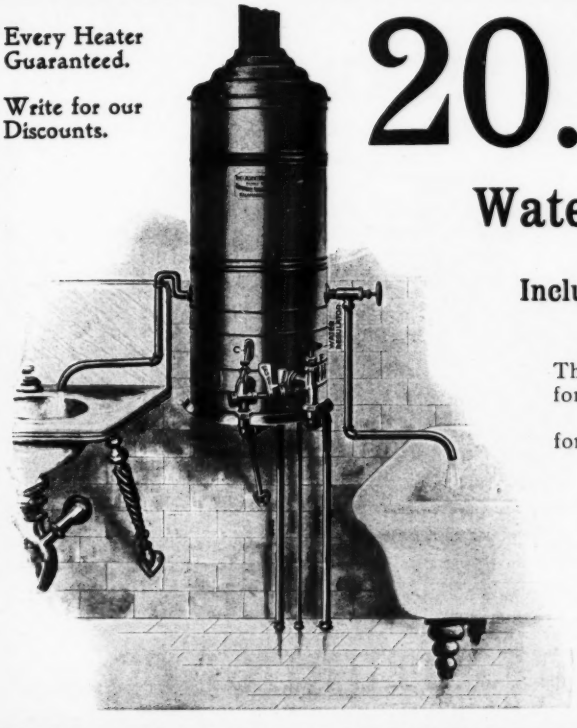
Capacities fully guaranteed. Write us about an agency. At the same time we'll send latest catalogue.

Gurney Heater Mfg. Co.

74 Franklin St., BOSTON.
111 Fifth Ave., NEW YORK CITY.

Every Heater Guaranteed.

Write for our Discounts.



20.00 is the price of the No. 8 Crescent Instantaneous Water Heater, Nickel Plated,

Including Nickel Plated Shelf and Bracket.

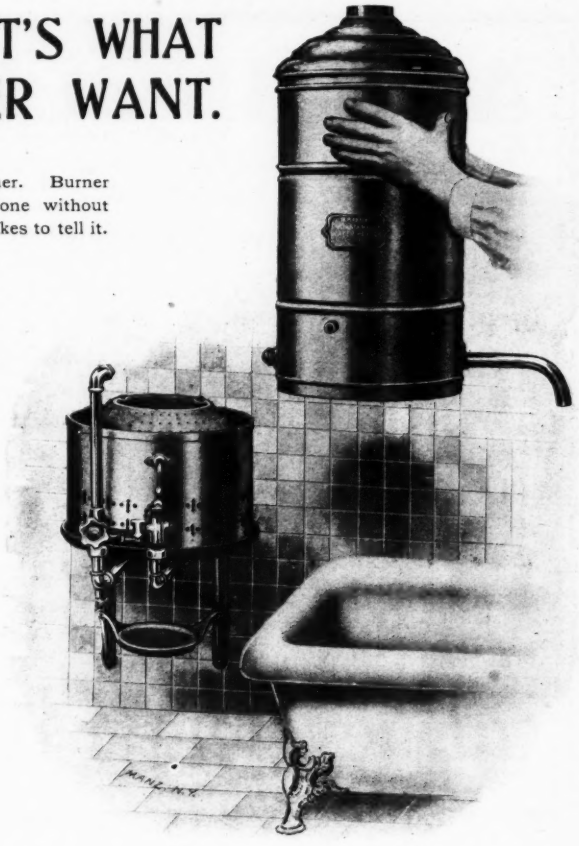
The greatest value in the water heater line ever offered for the money. We make all shipments "rush shipments." If you have not received our new catalogue, send for it immediately. It contains full and up-to-date information of the most perfect line of Instantaneous Water Heaters ever offered to the trade.

HUMPHREY MFG. & PLATING CO.

Kalamazoo, Mich., U. S. A.

IT'S GET-AT-ABLE AND THAT'S WHAT YOU AND YOUR CUSTOMER WANT.

Heater cleaned or repaired without removing Base or Burner. Burner cleaned if required, and tested independent of Heater. All done without shutting off main gas or water supply, and in less time than it takes to tell it.



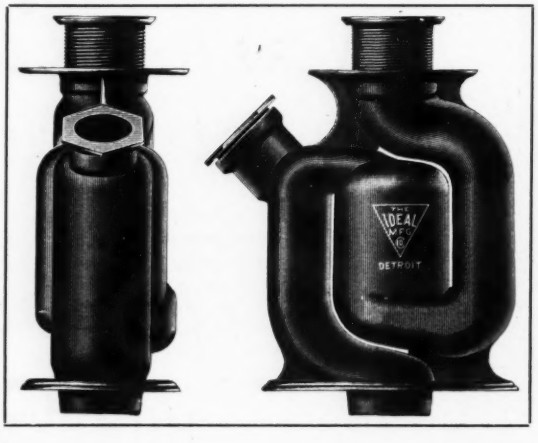
It's a feature embodied in the EAGLE Instantaneous Water Heater that cannot be found in any other.

This construction applies to the Nos. 1, 3, 5 and 7 Heaters, and which sizes are also fitted with the finest Set of Interlocking Valves with SAFETY PILOT that has ever been attached to a Water Heater.

THE S. BERNSTEIN COMPANY
MANUFACTURERS
126-130 SIXTH AVENUE CORNER TENTH STREET
NEW YORK

THE "IDEAL" CENTRIFUGAL NON-SYPHONING
TRAP STANDARD
WITH THREE INCH CLEAN-OUT PLUG ON SIDE

The Vent Hub can be used to calk for Cast Iron Pipe; for a slip joint for Brass or Lead Pipe by using the Compression Nut on top of the Hub; for Standard Iron Pipe by removing the Compression Nut.



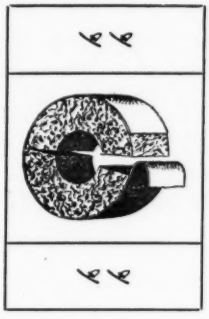
Will fit all standard sizes of Slop Sinks.

Write for prices, giving us the maker's name of the sink for which the Trap Standard is intended.

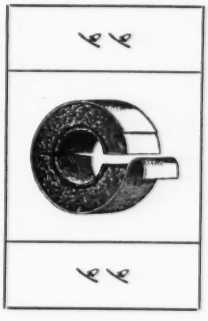
MANUFACTURED BY
THE IDEAL MANUFACTURING CO.
FACTORIES: DETROIT, MICH.
WALKERVILLE, CAN.
MAIN OFFICES, DETROIT, MICH.

The Best Coverings on the Market are

Norristown Pipe Coverings



Why buy substitutes when the genuine article can be obtained easily and is the cheapest in the long run. . . . . .



OUR Asbestos Magnesia Covering is the best of its grade on the market—as competitive tests prove.

OUR Felt, Air Cell and Vim Coverings for Low Pressure or Hot Water work gives excellent results.

OUR Cold Water and Frost Proof Coverings are giving universal satisfaction.

WE also manufacture several different grades of Asbestos and Magnesia Cements.

SHIPPING facilities unsurpassed. Write for samples and estimates.

Norristown Covering Co.

Main Office and Works: Norristown, Pa.

BRANCHES

New York: 242 Water Street, Phelps Bros., Mgrs.

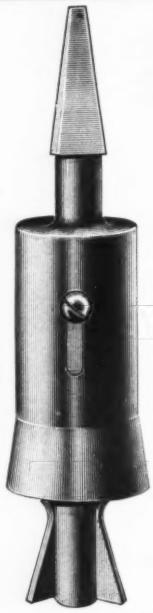
Philadelphia: 18-24 S. 7th Street, Builders' Exchange.

Baltimore: 113 South Gay Street, G. W. Carson, Mgr.

Washington, D. C.: 1208 E Street.

Boston: 411 Atlantic Ave. and 74 Purchase St.

SOMETHING NEW AND NOVEL



The Taylor Convex Reamer

EVERY ONE GUARANTEED

Something that every up-to-date plumber should have. The only way to do a perfect job is to use the Taylor Combination, viz :

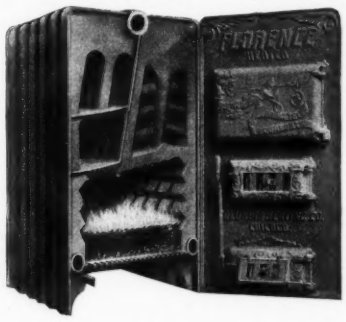
TAYLOR CONVEX REAMER,
TAYLOR WEDGE NUTS AND BOLTS, AND
TAYLOR BASIN CLAMPS.

Write at once for prices and discounts.

TAYLOR MFG. CO., Ltd.,
48 State Street, Detroit, Mich.

Eastern Office:
26 Cortlandt Street, Room 401, New York, N. Y.

For the next sixty days Taylor Manufacturing Co., Ltd. will send post paid to any part of the United States one Convex Reamer and a set of Basin Clamps, Nuts and Bolts complete for the sum of..... **$2.50**
and if they are not satisfactory in every way, money will be refunded.



The Florence Steam or Water BOILER

SHIPPED FROM

Columbia Heating Company	Chicago, Ill.
Factory	Belvidere, Ill.
Cahill, Swift Mfg. Company	St. Louis, Mo.
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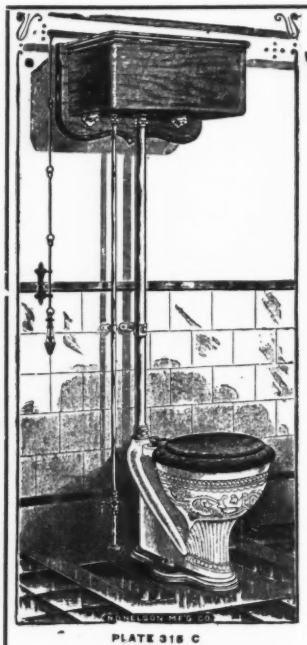


PLATE 318 C

Nelson's High Grade Syphon Jets.

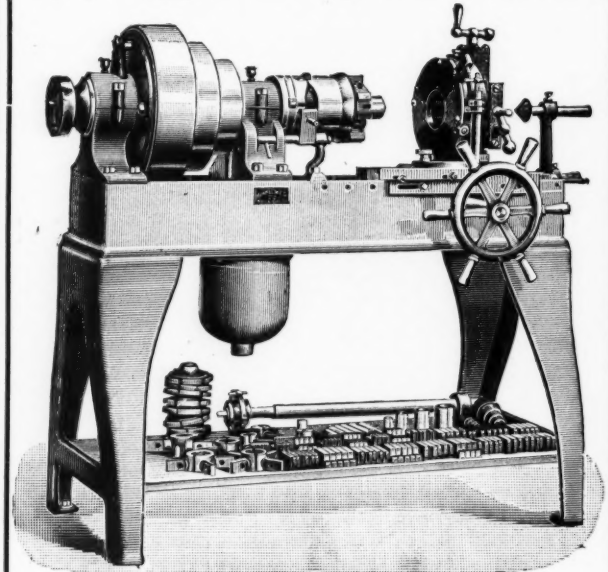
The New "Dominion"

Double Jet
Polished Wood Work
Mechanically Perfect
Absolutely Guaranteed

N. O. Nelson Mfg. Co.

...PLUMBERS' SUPPLIES...
ST. LOUIS, MO.

Apex Nipple and Pipe Mill Machine



Will thread nipples thread to thread all sizes within range of machine.
Equipped with our Standard Adjustable Quick Opening and Closing Dies, allowing cutting off of pipe close to grippers.
Nipple grips can be closed on threaded end of pipe without injuring thread.
Only machine on the market with this feature.
Write for catalogue and prices.

MERRELL MANUFACTURING COMPANY
208 Curtis Street, Toledo, O., U. S. A.

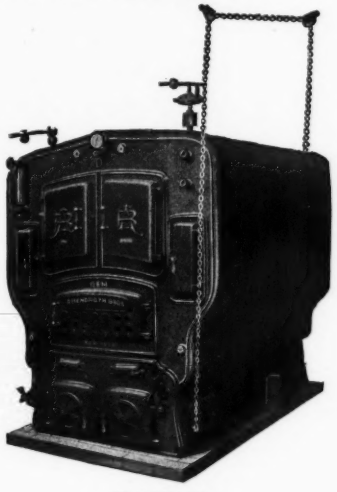
GEM HEATERS

Sectional or Round. Constructed with Headers or Push Nipples. They carry a steady water line. Sold through the trade only.

Abendroth Bros.

PORT CHESTER, N. Y.

109-111 Beekman St., New York City



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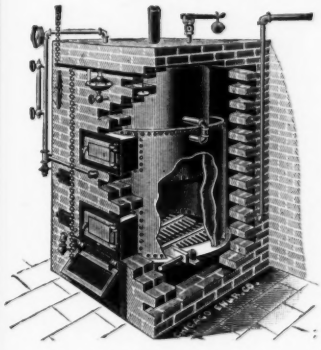
Minneapolis, Minn., Roberts Heating & Ventilating Co.
Kansas City, Mo., The Prest Furnace Co.
Pittsburg, Pa., The Kelly & Jones Co.
Leicester, Eng., British Steam Specialtist, Limited.

The Test of Time

as applied to thousands of these boilers—during more than a quarter of a century of use—has fully established their claim to be regarded as the cleanest, safest, most durable, most economical boilers for steam and hot water heating.

THE HAXTUN



All Vertical Fire Surface. All Steel. Burn Hard or Soft Coal. No Small Tubes. No Narrow Down Draft Flues. No Packed Joints.

Write for special Catalogue describing The Haxtun, The Defender, The Great Northern Boilers, The Tabasco Water Heater and Heating Supplies.

Kewanee Boiler Co.

KEWANEE, ILL.

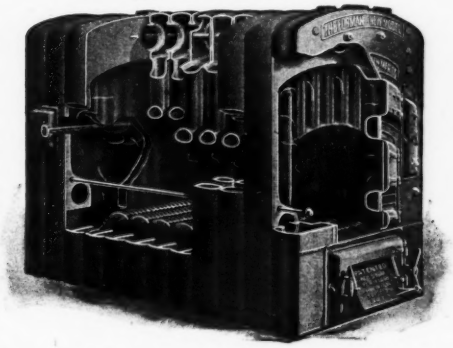
167-169 E. Lake St., Chicago 518 Bank of Commerce Bldg., St. Louis

You might as well

Increase your Heating Business by handling

Furman Boilers

They're made to please customers with profit to the Steamfitter —a desirable combination—we think.



Write us to-day for a copy of our New Book—**"The Practical Fitter,"** showing our complete line.

MADE IN OVER 150 STYLES AND SIZES
SECTIONAL PORTABLE BRICKSET

For burning all kinds of fuel. Specially low discounts to the Trade.

Address
The HERENDEEN MFG. CO.
Department D. **GENEVA, N. Y.**
New York: 39 Cortland St. Telephone, 5379 Cortlandt.
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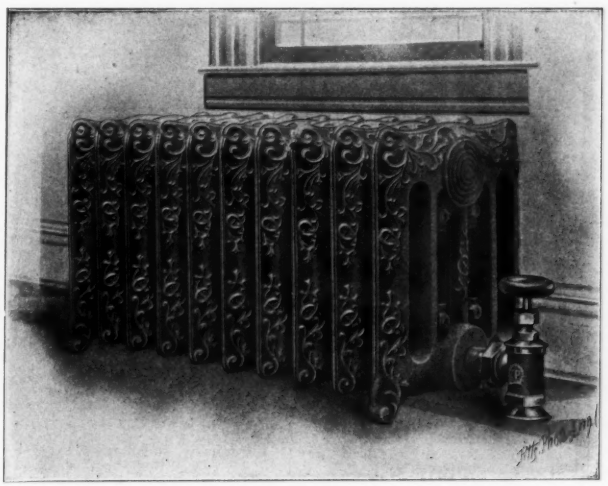
Solus Window Radiator

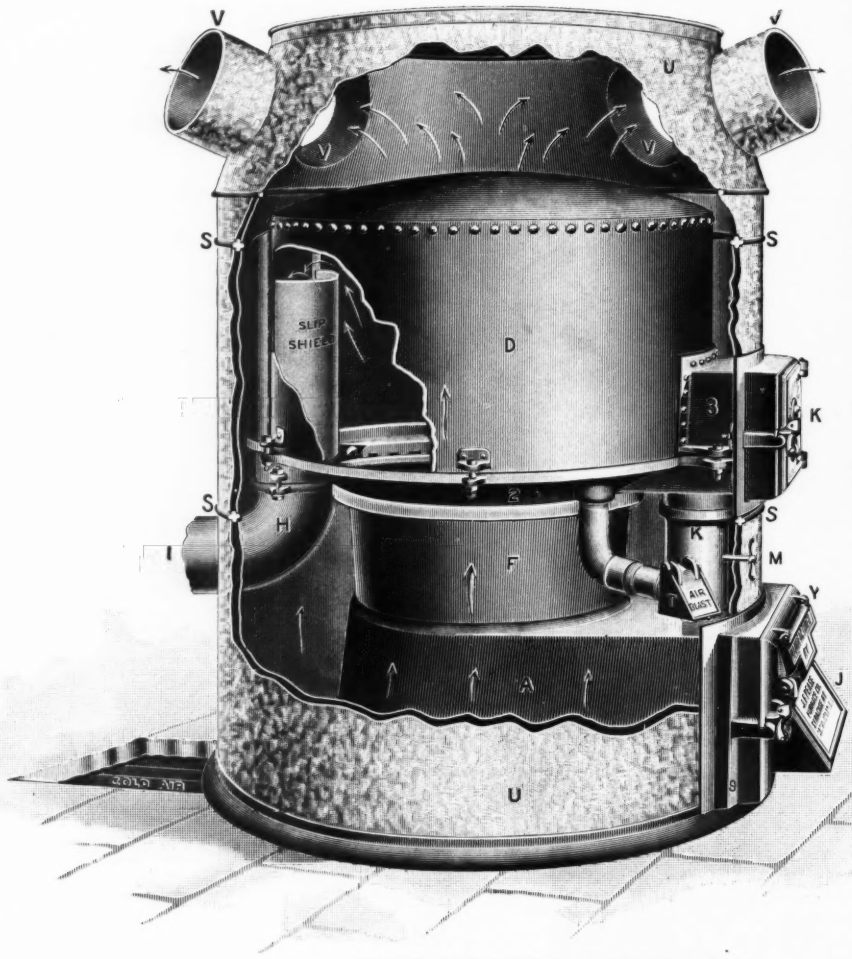


IN 14, 17 and 20 inch heights, same design as our SOLUS two and three column radiator.—The essential points in a radiator are workmanship, efficiency and design. We have them all, and the constantly increasing demand for our product is the best evidence that Steam Fitters and Architects are aware of this fact.

National Radiator Company

JOHNSTOWN, PA.

New York, 242 Water Street Philadelphia, Builders' Exchange



MADE WITH DOUBLE FEED DOORS.

Perhaps you can't sell him a BOILER what then?

WARM Air Heating with furnaces is on the increase. The best engineers in the business are interested. Don't let an unreasonable prejudice in favor of Steam or Hot Water cheat you out of a good Warm Air contract. The Economy Tropic Low Down is a well built furnace, burns hard coal or wood as well as Soft Coal; isn't expensive and can be erected in a low cellar.

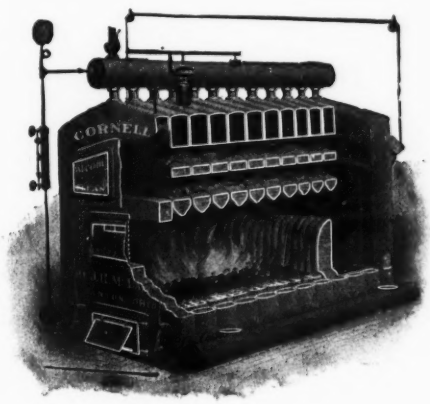
INTERNATIONAL HEATER CO.

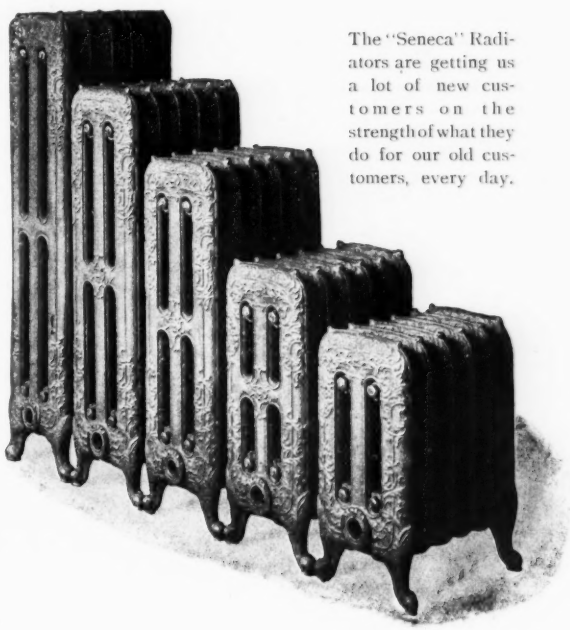
NEW YORK BOSTON UTICA, N. Y. CHICAGO DENVER

Northwestern Agents: Engineering and Steam Supplies Company, Minneapolis, Minn.

Some folks are particular—

in everything—others just in some things; about everybody is particular when it comes to heating their house. The Fitter is particular, the Boiler builder is particular and right here is where the particular business starts. A workman can't be particular with his work if he hasn't good iron, good equipment, good tools and a good place to work in; these things go to make efficient heaters and radiators, and we take a back seat for no one when it comes to being particular. That's one of the reasons we please so many particular people. It's the little things that count and our Square Fire Box "Cornell" Steam Boiler is the best that can be made for particular people.





The "Seneca" Radiators are getting us a lot of new customers on the strength of what they do for our old customers, every day.

THE J. H. McLAIN COMPANY

GOOD HEATING APPARATUS WITH A REPUTATION

GENERAL OFFICES AND WORKS

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BRANCHES: PHILADELPHIA CLEVELAND CHICAGO INDIANAPOLIS CINCINNATI
F. C. McLAIN, 254 Fourth Avenue, NEW YORK CITY

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Syracuse, N. Y., Sept. 7, 1901.

Monash-Younker Co.,
Chicago, Ill.

Gentlemen:- I have used a great number of your Perfected Duplex #6 Lock Shield Automatic air valves and have always found them to be a first class working valve. They have given the best of satisfaction.

Very truly yours,

Fitter Edward Joy.

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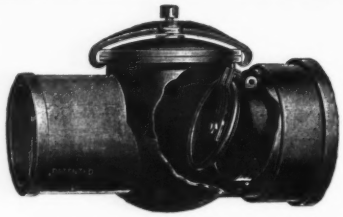

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SEWER GAS AND BACK WATER VALVE AND CLEANOUT

A perfect seal against sewer gas, back water and vermin. Best cleanout on the market.

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BATH TUB CLEANER AND DISINFECTANT

An indispensable article in every home and public building, for cleansing and purifying bath tubs, and for removing the slimy and greasy coatings that accumulate in waste pipes, sinks, lavatories, etc.

"Sanitas" Specialties

Including the "Sanitas" Traps and other well known devices.

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Exclusive Agents

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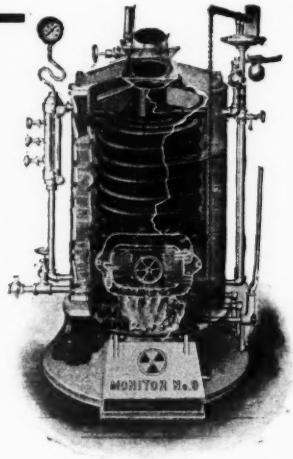
MONITOR

Improved Wrought Iron Coil

BOILERS



High pressure for power.

Low pressure for heating by

STEAM, VAPOR AND HOT WATER

Either hard or soft coal can be burned with economy and cleanliness. There is no danger of coils burning out as the water from the returns enters the coils and keeps them cool.

Send for Catalogue.

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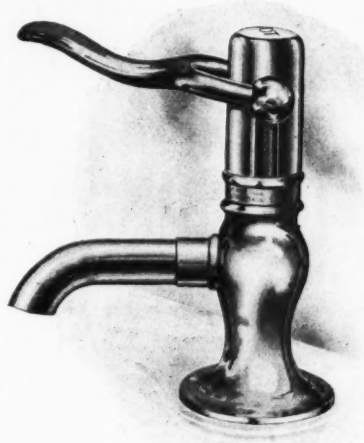

The Broughton Self-Closing Basin Cocks have been in use for many years. Some of the largest Hotels and Public Buildings in the United States are equipped with these goods. Made in Brass, Nickel or Silver Plated, and in Solid Silver-Metal.

EVERY ONE WARRANTED

Manufactured only by

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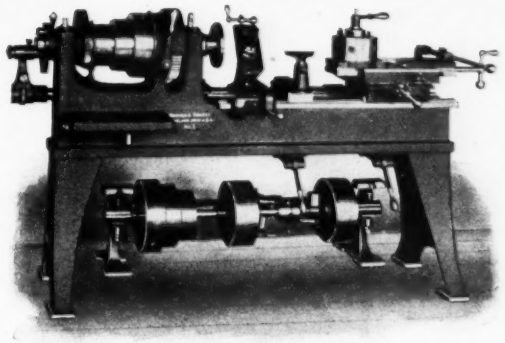
BRASS WORKING MACHINERY



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With Geared-friction Head and Chasing Attachment

1903 General Catalog illustrates and describes our complete line of Brass Working Tools. Mailed upon application.

THE WARNER & SWASEY CO.
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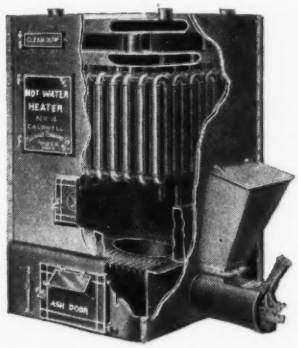

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Built like a water tube boiler, gives quickest circulation. Can empty the whole system. Used in connection with the Colton Under-Feed makes the most economical heater on the market. The only heater having a mechanical stoker.

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The Caldwell Furnace Foundry Company

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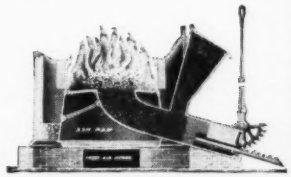

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forbids the purchase of three pumps when you can get ONE that will do the work of three.

THE PERKES

COMBINATION AIR, FORCE AND TEST PUMP

can be used for testing soil pipe, proving gas pipe, and is the best force pump on the market.

No stuffing boxes; all valves are on the outside, and work equally well with air or water.

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ESTABLISHED 1856

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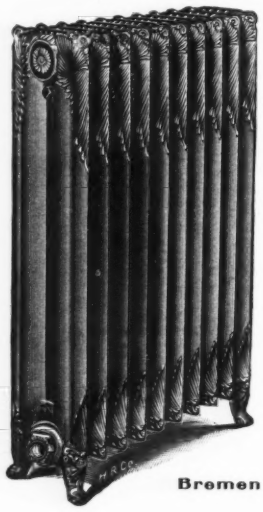
Holland Radiators



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Manufactured in all heights for Steam and Hot Water. A complete line of Two Column, Three Column and Window Radiators.

A postal card will bring you descriptive matter and prices.

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Brass and Iron Goods

Iron Body
Trap Screw Ferrule
with
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The Standard Pattern.

Original McNamara Hydrants and Street Washers.
Curb Boxes.
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New York Three Column

The Latest and Most Improved

Artistic Design

Full, Efficient Surface

All Heights

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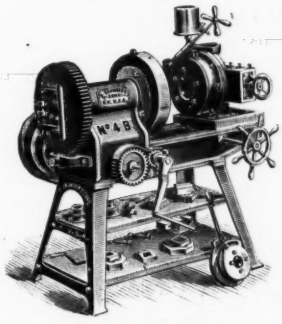

No. 4 B. Pipe Cutting and Threading Machine, ⅛-inch to 4 inches. Hand or Power.

D. SAUNDERS' SONS,

Manufacturers of Patent.

HAND

PIPE

CUTTERS

IN THREE STYLES.

One Wheel and Roller Cutter; Three Wheeled Cutter; Tool Cutter,

FOR CUTTING BRASS, COPPER AND WROUGHT IRON TUBES.

Also Manufacturers of Pipe Cutting and Threading Machines 1-4 to 16 in., Hand or Power.

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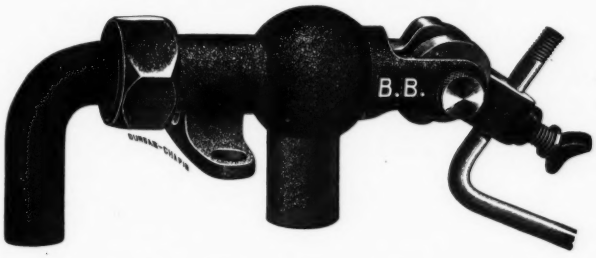
THE B. B. HIGH-PRESSURE BALL COCK



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No special packing required. Ground joint coupling which is always tight. Roller bearing lever on cam, reducing friction to lowest amount. No hammering, no singing or whistling. Has only one packing which is easily removed. Removable seat of best steam metal. We are making Floats stamped with our B. B. which are throughly guaranteed. Ask your jobber for them.

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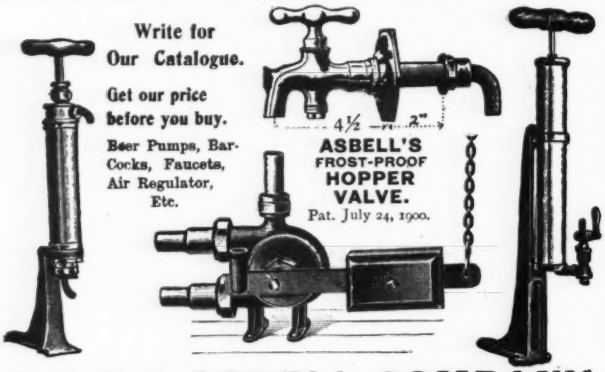

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Beer Pumps, Bar-Cocks, Faucets, Air Regulator, Etc.

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Pat. July 24, 1900.

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A MARVEL

of Strength and Efficiency

Always ready for instant use. It has a *Patent Force and Lift Cup* which will cover a 4 inch opening. It has a *Patent Adjustable Washer* from ¾ to 2 inches.

For Sale by the Leading Jobbers of the United States.

THE GIANT PUMP COMPANY
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The Success Water Heater

This heater is made for use in barber shops

It is efficient. It is durable.
It is compact. It is non-rustable.
It has a large cone-shaped heating surface and the heating cone can be easily taken apart for the removal of scale and other deposit.
Write for a circular and discount.

The Ransom & Randolph Co.
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Capacity three gallons.

EXTENSIBLE TRENCH BRACE OR DITCHING JACK

A useful appliance for bracing sides of trenches.

Saves Lumber, Labor and Time.

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Fitted with plain gas pipe barrel which can be readily changed. *Also sold without pipe, which can be put on to suit.*

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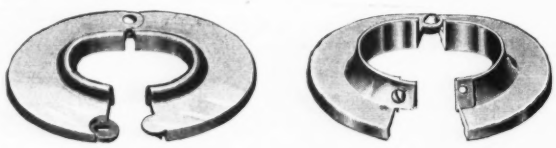

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Six different patterns of set screw and spring plates from ⅜ inch size to 8⅜ inches.
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The Beaton & Corbin Manufacturing Co.
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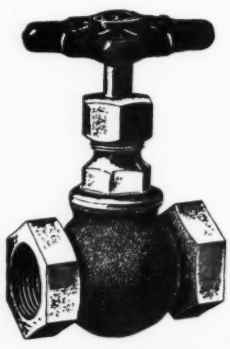

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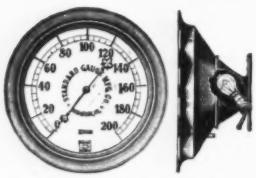
HIGH-GRADE WORKMANSHIP
PACKED STEMS
GENUINE STEAM METAL
THOROUGHLY TESTED

Sold from Standard Lists.

KINSEY & MAHLER CO., - PEORIA, ILL.

The "Standard" Illuminated Dial Gauge.



Is particularly adapted when gauge is placed at an elevation; or when light is not sufficient to show pointer distinctly on ordinary dial. There is no chance for error in properly locating position of pointer on the Illuminated Dial Gauge. A light placed in opening at back of case (generally an incandescent bulb) gives about the same effect as the Illuminated Tower Clock at night.

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IMPROVED WILHELMI BOILER PAT. AUG 12 1890 APRIL 11 1893
THE WILHELMI
THE MODERN
TWO BEST BOILERS
The "Wilhelmi" is a high-grade copper range boiler tested to 250 pounds and guaranteed to stand a working pressure of 150 pounds. There can be no better boiler made.
The "Modern" is for use where the pressure does not exceed 100 pounds, as that is the guaranteed working pressure. It is tested to 200 pounds.
BOTH BOILERS GUARANTEED NOT TO LEAK AND AGAINST COLLAPSE
Very attractive Discounts Furnished
For Sale only by Jobbers of Plumbers' Supplies
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Plumbers' Steam and Gas Fitters' Supplies

WAREHOUSES:
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OFFICE: 359 PEARL ST.,
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A long felt Want

The L & K TESTING VALVE & PLUG will enter the Hand hole on a running trap which no other Valve will do.

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Manufactured by

L. & K. TESTING PLUG

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104 to 110 Centre Street
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S. P. STAMBACH. ROBERT LOVE

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Plumbing Supplies and Sanitary Specialties

50 AND 52 N. SEVENTH STREET
PHILADELPHIA

There are places where any kind of stops will do. Again, there are places where none but the best will do. IN THOSE PLACES

Use Cleveland Cocks

THE CENTRAL BRASS MFG. CO.
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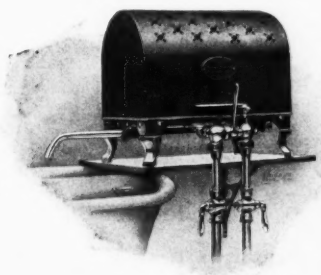
THE

"ADAM"

Instantaneous

Water Heater

Sold only to the trade



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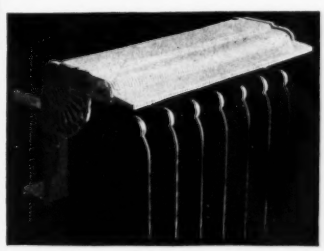
A "Perfect" Radiator Shield



The "Perfect" Shield meets the demand for a high-grade article which will be in harmony with other furnishings in a fine modern dwelling. It is nice enough for the finest room and cheap enough to be an item of economy in any class of buildings. It will protect your walls and ceilings and improve the radiation. It will fit any radiator and is provided with firm fastenings. It it made of crimped, galvanized steel with double top.

For further information and prices, address

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620 N. MAIN ST., DECATUR, ILL.

ELECTRIC HOUSE SERVICE PUMPS

WILLIAM E. QUIMBY, Inc., 141 Broadway
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NEW ORLEANS:
THE SAFETY ELEC. MFG. CO.,
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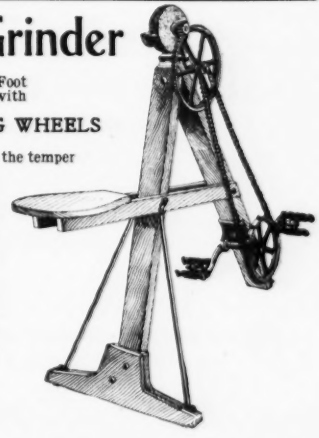
The "Success" Grinder

Has the Highest Speed of any Foot Power Grinder and is fitted with

CARBORUNDUM GRINDING WHEELS

Will grind anything without drawing the temper



Is regularly equipped with **two** Carborundum Wheels and complete **polishing outfit,** consisting of felt wheel coated for use, and cloth **buffers** with the necessary polishing compound for plumbers to polish up rough or finished brass.

Will be shipped without advance payment to any part of the United States **east of the Rockies** on ten days free trial. If satisfactory remit us $9, less the freight. If not entirely satisfactory return to us at our expense.

LUTHER BROS. CO.
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THE CHAMPION
HOT WATER
Combination Heaters
They Fit Any Furnace.

These Boilers are made in three sizes diameter, and from 100 to 600 square feet radiation capacity. Will heat those cold rooms, or an addition to the building. Will increase the capacity of any furnace. Are cheaper than coils and will do more work. Write for new circular.

Manufactured by

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GUARANTEED **Have You Ever Used**

"DUPLEX"
TESTING PLUGS

IF NOT we will send one or more on **30 Days Trial.**

"One" Plug Covers Hubs 2 to 6 inch Pipe and Hopper Traps,

NEW JERSEY PLUMBING SPECIALTIES COMPANY
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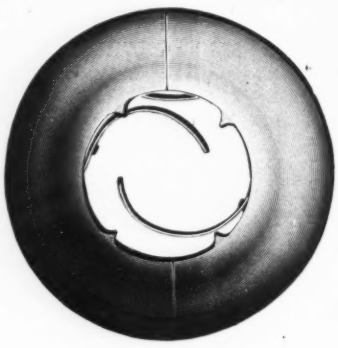

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Our Floor and Ceiling Plates are the best in the World.

We are also makers of the only ball bearing plates in the world Better goods than ours are not to be found on the market

Send for discounts

L. H. Snyder & Co.
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THE PARKER COMBINATION PIPE VISE....

Especially adapted to Plumbers and Steam Fitters use. Made in Six different sizes and every Vise all right. Ask for the "Parker" and you get a good tool. Sold by Jobbers.

...THE...

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Vacuum System
..Of Heating..

Guaranteed to save 25 per cent in fuel. Official test places the saving at 25 to 60 per cent. Is entirely automatic and noiseless in operation. Has all the advantages of Hot Water Heating and none of its objectional features. Such a thing as an explosion is an utter impossibility. In case of breakage, no water or steam will escape in the room. This is the coming heat of the 20th century. Call on or Address

The James A. Trane Vacuum Heating Co.
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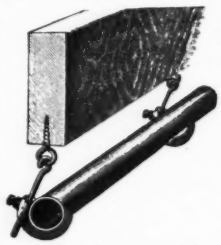
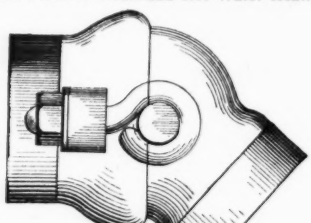
"Kriebel's Adjustable Elbow"

You can't very well afford to do without them in Low Pressure Steam and Hot Water Heating.



The K. Adjustable Pipe Hanger
is the best, because simplest, most convenient and easiest adjusted. Try it, be convinced.



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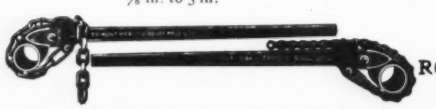
"Trimo" Pipe Wrench, eight sizes from 6 in. to 48 in. long. Capacity from ⅛ in. to 5 in. pipe.

"Trimo" Pipe Cutter, three sizes. Cut Pipe from ⅛ in. to 3 in.



"Trimo" Bull Dog Wrench, seven sizes. Capacity ⅛ in. to 12 in. pipe.

"The Big Three"

Specialties of the

Trimont Mfg. Co.
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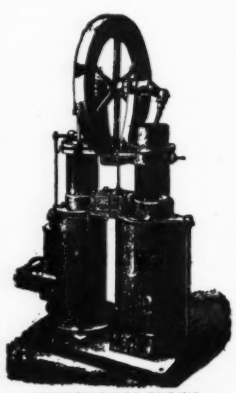
Quality Guaranteed.



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DENNEY IMPROVED
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HOT AIR PUMPING ENGINES

The most Reliable and Economical Engines for pumping water. Use any kind of fuel. Can be operated by any one. Perfectly safe, Noiseless, and Always ready for service. Important Improvements Patented and NOT FOUND in any OTHER MAKE of engines. Send for catalogue and testimonial list.

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In All The World

no machine is better made or more perfectly meets every requirement than the OSTER PIPE THREADING MACHINE. For hand or power. Does its work easily, quickly and accurately.

SEND FOR PARTICULARS.

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HANNA BALL JOINT Pipe Hanger

Simplest — Strongest

Made of Malleable Iron

Carried in Stock and For Sale by All Supply Houses.

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A WIPING CLOTH

A cloth which is always ready for use.
No greasing necessary.
Made of best Herringbone ticking and the finest moleskin.
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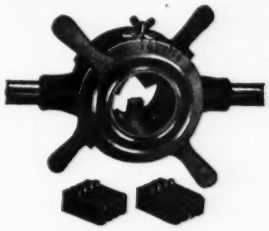

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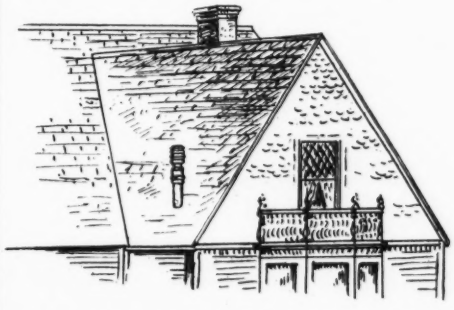

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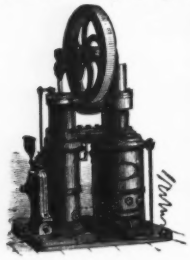

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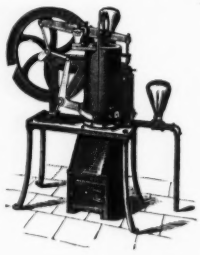

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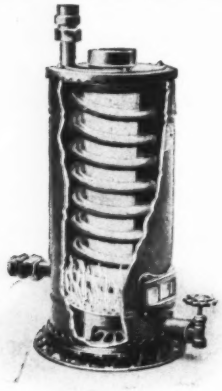

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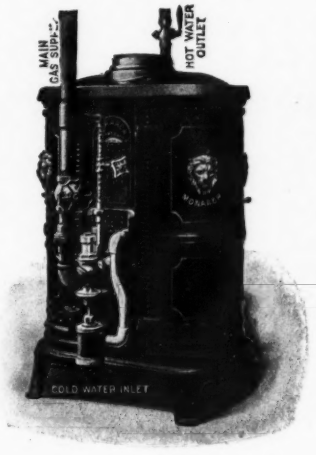

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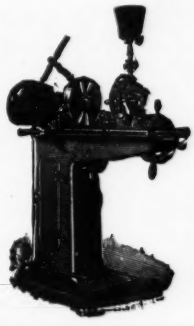

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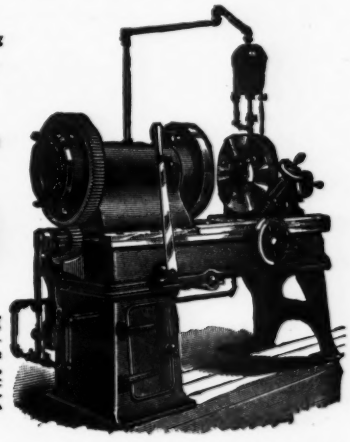

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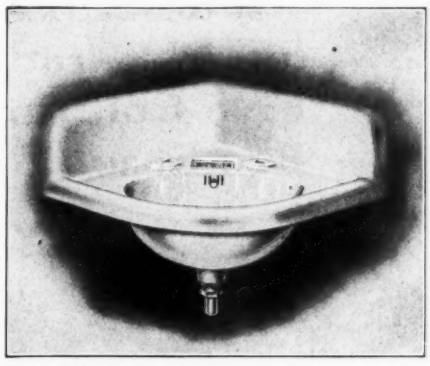

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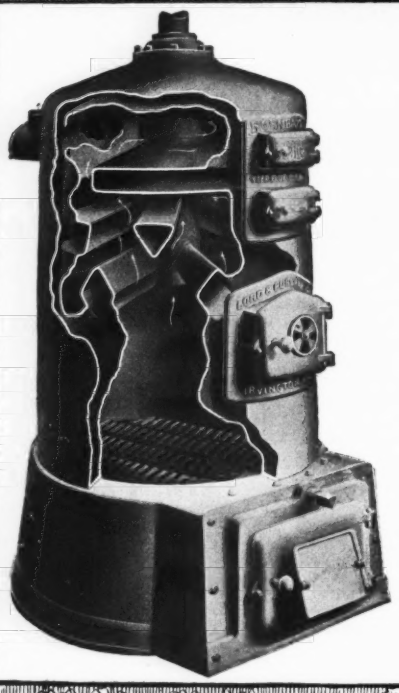

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Whole No. 168 OCTOBER TWENTY-FOURTH, NINETEEN HUNDRED AND THREE Vol. 26, No. 1

Pipe Gallery Experience.

A Repor tprepared in August 1903 by James C. Bayles, M. E., Ph. D., Consulting Engineer, at the Request of Hon. Jacob A. Cantor, President of the Borough of Manhattan.

A REPORT summarizing foreign experience with pipe galleries in cities, and showing the advantages of such galleries for New York, could have been complied with more satisfactorily to myself had the time been afforded for a personal inspection of the works to be referred to. Although I have seen most of them and gathered the best available data as to those I have not seen, my information is neither as fresh nor as exact as I should have been glad to make it had your requirements been less exigent in the matter of time.

While experience with pipe galleries or their equivalents is limited, I have yet to learn of any instance in which it has not been satisfactory in important and compensatory public benefits. The reason they are not more general is that the need for them is never realized until to provide them becomes so formidable an undertaking that the temptation to postpone is yielded to until the evils they are designed to correct have become intolerable. Municipal growth, whether slow or rapid, usually occurs by stages which are scarcely perceived, or at least scarcely realized, by citizens with whom it is a matter of daily experience. The village expands into a town, the town into a city and the city into a metropolis without awakening a realizing sense among its people of the steps by which this process is effected. As new public wants are felt it is usual to meet them by the easiest of available expedients. Corporations which originally undertake provision for the public needs usually exact large privileges and forever after defend the propriety of their demands by emphasizing the risks assumed by capital in connection therewith. It is not the habit of communities to look very far into the future. As the result, that happens almost everywhere which has happened in New York. From curb to curb the streets are gradually filled with subterranean pipes and ducts, municipal and private, and not until it is realized that the constant attention which these pipes and ducts demand is fatal to the maintenance of unobstructed streets and satisfactory pavements and that in the case of buried pipes leakage is constant and increasing, does public opinion demand their grouping in adequate tunnels. It is then found both costly and difficult. Corporations are extremely jealous of what they have learned to regard as vested rights in the possession and use of public property. We see how easy it is for the opposition which is the outgrowth of corporate inertia to prevail against public opinion, in the failure of the efforts of the advocates of pipe galleries, including the accomplished Chief Engineer of the Rapid Transit Commission, to secure the necessary appropriations for their construction in connection with any part of the extensive system of tunnels covered by Subway Contract No. 1. Some such opposition has developed, in the hope of defeating it in connection with Subway Contract No. 2. So much of this as is not unintelligent is wholly selfish, and doubtless grows out of the fear that the very great advantages to the corporations which will use pipe galleries would be coupled with the requirement that they make a fair return in annual rental for the accommodations provided for them. Exactly the same kind of opposition delayed for years compliance with the popular demand for the abolition of overhead wires and sustaining poles in New York, but with the essential difference that no great and unique opportunity was lost during the time required to overcome it, as was the case when the efforts to secure the construction of pipe galleries in connection with our main lines of Rapid Transit Subway in Manhattan failed by reason of the impossibility of co-ordinating the influences which favored it.

Regulation of Plumbing in Montreal.

The following is the by-law of the city of Montreal regarding plumbing, drainage and ventilation of buildings:

Sec. 1. No person shall engage in or work at the business of plumbing, as "Master-Plumber," unless such person, has taken a license therefor in accordance with the following provisions of this By-law. A firm may engage in or work at the business of plumbing, provided a member of such firm has obtained a license as plumber and a corporation may engage in or work at said business, provided such corporation has in its employ as manager or superintendent a licensed plumber.

(1) The word "Master Plumber," used in this By-law, shall be deemed to mean a person who keeps a plumber's shop and undertakes plumbing works which he executes himself or by his employees, and who has passed an examination and obtained a license as such.

(2) Every person who, not having obtained a license as Master-Plumber, executes plumbing, drainage or ventilation works, in the City, shall pass an examination before the Board of Examiners, and, after having received a certificate of competency, shall register his name and address at the office of the Health Department.

(4) The said Board of Examiners shall then appoint a chairman, and designate the time and place for the examination of all applicants desiring to engage in the business of plumbing within the city of Montreal. Said Board shall examine said applicants as to their practical and theoretical knowledge of plumbing, house drainage, and plumbing ventilation, and shall submit the applicant to some form of practical tests, and if satisfied of the competency of the applicant, shall so certify and issue a license, authorizing him to engage in the business of plumbing in Montreal, either as a master or journeyman plumber.

(5) The fee for a license shall be five dollars for a master or plumber, and said license shall be renewed yearly, on the payment of one dollar for master or plumbers.

"No person shall have the right to put up a sign of plumber within the city limits, if he does not possess a license as master-plumber, issued by the Board of Examiners of Plumbers appointed by the Council of the City of Montreal."

Sec. 2. Every licensed plumber shall be required to register his name and place of business at the office of the Board of Health, and to give notice at the said office in case of the removal of his place of business.

(1) An official list of such plumbers, recognized by the Board of Health, shall be published, in at least one English and one French daily newspaper, once a year during the month of May.

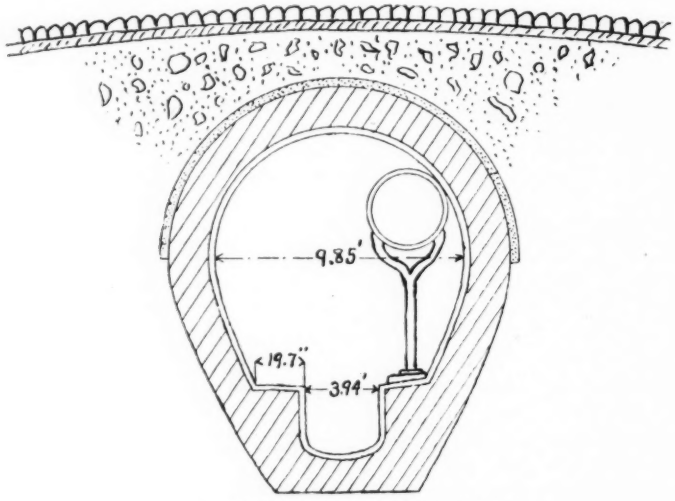
(2) It shall be unlawful for any person to carry on the trade of plumbing in the City of Montreal, unless licensed or registered as above.

(3) Every licensed master plumber shall be held responsible for all the acts of his agents or employees, and any licensed plumber who neglects or refuses to comply

Before taking up the subject of the necessity for and the advantages of pipe galleries wherever it is possible to build them in New York, which must ultimately mean in every important avenue and street of Manhattan at least, permit me to call your attention to such data as I have been able to gather in the very limited time at my disposal concerning the underground pipe subways of other cities.

Paris.

The familiar facts relating to the sewers of Paris and their utilization for the accommodation of water mains and other pipes, and of electrical conductors, scarcely need recapitulation here. The authorities I have consulted differ as to whether gas mains are anywhere found in these drainage tunnels. Some say they are; others, by omitting reference to them, warrant the conclusion that they are not. That the sewers are not generally utilized for gas mains is probable, but I am informed that they have been so utilized



PARIS SEWER SUBWAY, TYPE. NO. 5.

locally. The Paris gas practice is to lay mains under the sidewalks, near the curbs. *Engineering News* of August 22, 1895, in a general description of the Paris sewers, said:

"The sewers of Paris act not only as subterranean channels for the removal of waste water, but they also form galleries everywhere accessible and well ventilated, and in them are carried the pipes for the pure water supply of the city. * * * This disposal of the water pipe system presents the advantages of permitting all leaking to be closely watched and at once checked, and of protecting the public streets from interference or damage. In addition to the water mains the sewers also carry the telegraph and telephone wires, pneumatic tubes for mail and packages and compressed air conduits for motive power."

The Paris sewers are usually built of a light grit stone and are lined throughout with cement. They are of various shapes, according to width and grade of streets. One typical cross section, known as Type No. 5, is shown in the accompanying illustration. They are for the most part oval or ovoid, the sewer flow being concentrated in a relatively narrow channel at the bottom. The least height permitted is 6 feet from crown to trough bottom.

The journal above quoted says, editorially: "The almost perfect condition of the Paris streets is intimately connected with the fact that the disturbance of the street surfaces by pipe trenches is practically eliminated. Water and gas pipes, telegraph and telephone wires, pipes for compressed and hot air, and the entire tangle of fixtures and appliances buried under the streets of other cities are here disposed of in roomy, well-ventilated and well-lighted subways. Aside from the fact that this disposition does away with cutting into and replacing the pavements and prevents the obstruction of the streets by poles and overhead wires, there are other economic advantages. Pipes buried in the ground are usually left to take care of themselves until some radical and apparent defect or leakage makes repairs imperative, not only on the pipes but on the streets as well. In the Paris subways the pipes are always accessible; they can be kept in thorough repair and will consequently last longer; the smallest leak is at once detected and checked, and waste is prevented. Finally, when a new and better system is devised for any purpose, old fixtures can be removed and new ones put in with a minimum of expense

with the provisions of this By-law, may have his license suspended or canceled by the Board of Health, in which case he shall be debarred from obtaining a permit to do any work during such length of time as the said Board may deem proper.

Sec. 3. All plumbing, and house drainage, and ventilation in the city, shall be made and constructed in accordance with the following rules, which shall be binding on all parties concerned.

(1) No drains shall be made, or plumbing work done in any building, the cost of which shall exceed $25, until a permit to do so has been obtained from the Sanitary Engineer.

(2) No alteration of drains or plumbing work in any building affecting its sanitary conditions the cost of which shall exceed $25, shall be undertaken before giving notice to the Sanitary Engineer. Forms of application, and specification for the drains and plumbing work of a new building and for alteration of the same in old buildings, will be supplied by the Health Department.

(3) Pipes, drains and plumbing work shall not be covered or concealed from view, until approved by the Sanitary Engineer of the Board of Health, who shall examine the same within our legal working day after a written notice that they are ready for inspection.

(4) The material used shall be of good quality and free from defects, and the work shall be executed in a thorough and workmanlike manner.

Sec. 4. The arrangement of the soil, waste and ventilation pipes shall be as perpendicular and direct as possible, and no change of direction shall be made by angles less than 45 degrees as amended by No. 297.

(1) The soil, drains, waste and drain ventilation pipes shall be exposed to view, ready for inspection and for convenience in repairing.

(2) When necessarily placed within partitions or recesses of walls, soil, drain, waste or ventilation pipes shall be covered with woodwork, so fastened with hinges or round headed screws, as to be readily uncovered.

Sec. 5. Every house or building shall be separately and independently connected with the street sewer, in front of such house or building, or with such other sewer as shall be designated by the Board of Health.

"Every drain shall have a threaded opening near the inside of the front wall, accessible at all times for the purposes of inspection and test."

Sec. 6. Interior house drains, when above ground, shall be of cast iron. When laid underground, the drains shall be of very heavy cast iron or vitrified clay pipe, and shall have a fall of at least ¼ inch to the foot. Where water-closets discharge into them, the pipes shall be at least four inches and not more than six inches in diameter, for private houses; but for public buildings, they shall be of any size approved by the Sanitary Engineer, and be laid in a straight line if possible. All changes in direction shall be made with curved pipes when of cast iron, and with Y pipes when of vitrified clay; and at least one clean-out length shall be provided at each change of direction.

In all cases of soft ground, vitrified clay pipes must be laid upon at least four inches of concrete.

Sec. 7. No bricks, sheet metal, earthenware, or chimney flue, shall be used as a sewer ventilator, or to ventilate any trap, drain, soil or waste pipe.

Sec. 8. Soil pipes shall be of cast iron of the weights specified in section 15 and shall extend at least 2 feet above the highest part of the roof, or coping, undiminished in size, and in no case shall they be less than 4 inches in diameter; where the soil ventilating pipes come within 20 feet of any windows, open louvres, or other open-

as compared with methods elsewhere. In New York, under many streets, old, unusued lines of gas and other pipes are rusting slowly away, interfering with street excavations and causing settlement as they collapse, simply because it will not pay to dig them up. With a subway system this would be impossible. One thing is certain: until some subway system is built we (New York) can never have good and permanent street pavements. And it is also certain that the perpetuation of present methods means, in a term of years, the waste of a sum of money equivalent to the cost of even the Paris subways; waste in the constant renewal of pavements, increased cost of street cleaning, leaking pipes and the increased money spent in laying, maintaining and changing the present network of pipes and wires under our highways."

The economic value of reducing waste by a leakless distribution of water in accessible mains is shown by the fact, as reported by Columbus O. Johnson, ex-Water Registrar of New York, in his investigations for the Merchants' Association, in March, 1903, that the total water consumption of Paris in 1900 was a daily per capita of 249 liters, divided as follows: 86 liters spring water and 163 liters river water. The spring water is the domestic supply; the river water is used for sprinkling and washing streets, flushing sewers, extinguishing fires and other public and industrial uses. This represents a per capita consumption of 55 1-5 U. S. gallons in a city which, in its sanitary policing, uses water with a liberality which would now be impossible in New York. Compared with the per capita consumption of this city (117 gallons per day in Manhattan in 1900) the contrast is startling.

It would be obviously unfair to credit all of this difference in water consumption to the checking of leakage, but in view of the fact that very nearly 66⅔ per cent. of the water supplied to New York is unaccounted for and that the greater part of this undoubtedly represents leakage into the ground, the economic value of leakage prevention should need no support in argument. The invaluable literature of 1900 relating to the water supply and distribution of New York, is available to anyone who may wish to consult it.*

Milan.

In his admirable work, "Municipal Government in Continental Europe," Dr. Albert Shaw gives the following popular but intelligent description of the pipe galleries of the Via Dante, Milan:

"The Via Dante was constructed as the direct approach from the heart of the city to the curved front of the symmetrical new park. It is paved with wooden blocks on a concrete foundation, is lighted with electricity and is traversed by an electric street railway. But it is more notable for its underground construction than for its beautifully executed surface; for, apart from the main sewers, there are subways on either side of the street, 6 feet high by 4 or 5 feet wide. These subways adjoin the front foundation walls and make it easy to inspect and repair the drain pipes which connect the houses with the sewers. Within the subways are placed the water pipes and gas pipes, electric wires, etc., and passages extend from them to the main sewers. It is considered in Milan that no street elsewhere in Europe so completely embodies the best principles of construction—below the surface if not above—as the new Via Dante."

I regret that in the time at my disposal I was unable to obtain any fuller description of the Milan pipe galleries, or any illustration showing their shape or arrangement.

St. Helens.

The city of St. Helens, one of the most enterprising of the North of England municipalities, has admirable pipe galleries. From a report prepared by G. J. C. Broom, C. E., Borough Engineer, I take the following data as of April, 1899:

"An engineer to a municipal corporation has many difficulties to contend with, and one of the greatest of these is the maintenance of the surface of the streets, where such surface is being continually taken up to relay or repair gas and water mains and electric cables. This applies more particularly to streets laid with granite, wood or asphalt paving, as they are usually on a concrete bed, to disturb which is an extremely costly undertaking, and it is difficult to replace the surface in a satisfactory manner. To localize leaks and defects in mains laid under a concrete bed sometimes necessitates the taking up of a considerable portion of the street, besides which it is a source of great annoyance to an engineer to have a newly-laid surface destroyed for purposes of repair and renewal, and its consequent interference with traffic and business.

"In connection with the purchase of the tram system by the Corporation

*Report Upon New York's Water Supply, made to Hon. Bird S. Coler, Comptroller, by John R. Freeman, C. E.

An Inquiry into Conditions Relating to the Water Supply of New York, by the Merchants' Association.

ings, they must be carried up 5 feet above top of such window or opening.

Soil, waste and vent pipes, in an extension, shall be carried above the roof of the main building when they are closer than twenty feet to the windows of the main building.

Sec. 9. All traps shall be adequately protected from syphonage or air pressure, by vent pipes of a size not less than one and a half inch in diameter, unless where antisyphon traps or other approved devices are used.

Sec. 10. Joints of sewers and soil pipes shall be gas and water tight.

Sec. 11. When stacks of pipe are required for sinks only they shall be carried through the roof, and be not less than 2 inches for 4 sinks or 3 inches for over that number, but the portion above the roof in all cases must be 1 inch greater diameter than that below the roof.

Sec. 12. When lead pipes are used to connect traps with vertical vent pipes, they shall not be lighter than 6 pounds sheet lead to the square foot. All such pipes shall be properly supported to prevent sagging.

Sec. 13. There shall be no traps in connection with vertical soil or waste pipes.

Sec. 14. All pipes shall be sound and free from holes or cracks and shall be oiled above ground and tarred under ground after having been tested.

Sec. 15. The following weights per lineal foot, for cast iron and lead pipes, are the minimum weights:

IRON PIPES.
(Interior Measurement.)
FOR PLUMBING WORK.

2 inch	4	pounds per lineal foot.
3 inch	6½	pounds per lineal foot.
4 inch	9	pounds per lineal foot.
5 inch	12½	pounds per lineal foot.
6 inch	17	pounds per lineal foot.
4 inch	13½	pounds per lineal foot.
5 inch	17	pounds per lineal foot.
6 inch	20	pounds per lineal foot.

LEAD PIPES.

1¼ inch	2	pounds per lineal foot.
1½ inch	2⅓	pounds per lineal foot.
2 inch	2¾	pounds per lineal foot.
2½ inch	4½	pounds per lineal foot.
3 inch	5⅓	pounds per lineal foot.
4 inch	7	pounds per lineal foot.

FOR WASTE SINK PIPES.

2 inch	10	pounds for lineal foot.
3 inch	14	pounds for lineal foot.

(1) Iron pipes shall have their weight stamped upon them.

(2) Lead waste pipes, bends or cess-pools, shall be equal to not less than 6 pounds per square foot of sheet lead.

(3) The fitting used in connection with such pipes shall correspond with them in weight and quality.

Sec. 16. Plumbing work shall not be used unless the same has first been tested in the presence of the Sanitary Engineer or his representative with the water test, or if that is not practicable, with the peppermint, smoke or other reliable test, and if said test is satisfactory, he shall issue a certificate to that effect.

(1) The plumber shall give a written notice, on forms issued by the Department, to the Health Office, that his plumbing works at such a number and such a street are finished and ready for test.

The test of plumbing works shall be made in the presence of the Sanitary Engineer or his representative, within one legal working day following the sending in of the notice.

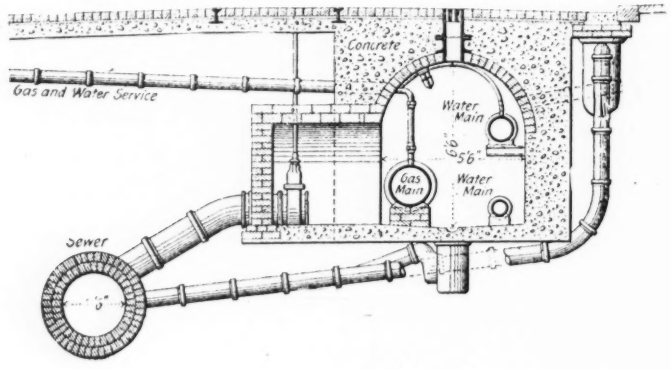
When defective pipes are discovered, they shall be removed and replaced by sound pipes; defective joints shall be made tight, and every part of the work in which defects are found, shall be made to conform to the present rules.

Sec. 17. Joints in iron drain, soil and waste pipes, shall be filled with oakum and

of St. Helens, and the decision of the Council to relay the tram lines and equip them for electrical traction, the question of the construction of a subway in the main business thoroughfare was brought before the Council. The argument in favor of the construction of such a subway was very much strengthened by the fact that the whole of the surface of the street had to be disturbed for the purpose of constructing a new main sewer, the renewal of gas and water mains and services, and the laying of electrical cables.

"The question was therefore brought before the various committees whether it would not be more economical and satisfactory, in view of the narrowness of the streets, the number of mains and the costly and unsatisfactory results of interfering with the surface and foundations of the streets, to construct a subway by which the whole of the works beneath the surface could be properly inspected, repaired and renewed, from time to time, without in any way interfering with the traffic and convenience of the business people after the work had once been completed, and they instructed the Borough Engineer, the Water Engineer and Gas Engineer to inquire into and procure particulars of subways already constructed in other places. With this object, visits were paid to London and Nottingham, these being the only places (in England) where subways had been constructed. * * *

"On receiving the report of their engineers the corporation resolved to construct the subway in Ormskirk street, Church street, and Ravens street, for which plans were prepared by the Borough Engineer and adopted by the Council. The plans showed a subway constructed wholly of concrete, with the exception of a 4½-inch ring of blue brick to form the arch around which the concrete was to be laid. This concrete also formed the bed for the paving



ST. HELENS PIPE GALLERY.
(Typical Section, showing Sewer and Main Connections.)

of the street. The subway is 6 feet 6 inches high and 5 feet 6 inches wide, the total length being 680 yards. The form of construction and the arrangement of the mains is shown in the sketch.

"The subway is ventilated by means of open gratings 100 feet apart. Side entrances have been constructed on the foot-path at each end, and also midway between them, an opening in the foot-path, 14 feet long by 9 feet wide, through which gas and water pipes can be conveyed when required. This opening is covered with eight Hayward prism lights and is provided with means of access and fencing for protection during use. The subway has a corresponding inclination with the surface of the street, and is drained at frequent intervals by means of trapped gullies connected with the sewer. Further, a special valve is inserted in the lowest portion of the subway, to be used in emergency, should a serious burst take place in the water mains. The subway is lighted throughout with electricity, all switches, fittings, etc., in connection therewith being water and air tight, and every precaution has been taken so that in case of a leakage of gas the light can be turned on without fear of an explosion. The lights are 28 feet apart and arranged in groups of five, with pilot lights between, the whole being controlled by main switches in the center chamber.

"The positions of all intersecting streets are indicated by names on plates fixed to the wall.

"The subway at present contains one gas main, 18 inches diameter, and two water mains, one 10 inches and the other 6 inches diameter. The services for both gas and water are passed through 6-inch earthenware pipes, beneath the roadway where necessary, to the underside of the curb on either side of the road. Due provision has also been made for carrying the telephone and electric light cables, and these will shortly be laid. The work of constructing the subway, together with the laying of the gas and water mains and tram

lead, and hand caulked, so as to make them gas tight, and they shall not be painted, varnished, tarred or puttied; the said joints may also be screw joints; should the work prove to be satisfactorily executed, the Sanitary Engineer shall grant a certificate to that effect to the person concerned.

Sec. 18. All connections of lead with iron pipes, shall be made with brass sleeve or ferrule of the same size as lead pipes, which shall be carried inside the ferrule, put in the hub of the branch of the iron pipe and caulked with lead; and the lead pipe shall be attached to the ferrule by a wiped joint.

All connections of lead pipes shall be by wiped joints.

Sec. 19. No tile pipe shall be connected with the soil or waste pipe, unless the same be provided with a metal flange to admit of a proper connection being made.

Sec. 20. Every water-closet, urinal, sink, basin, wash-tray, bath, and every tub shall be separately and effectively trapped. This rule shall apply to a set of tubs, but only one trap shall be required for the set.

Traps shall be placed immediately next to the fixtures, and in no case shall they be distant more than two feet from the fixtures.

There shall be only one trap under the water-closet and that immediately beneath the same.

Sec. 21. The connection between iron and tole pipes shall be made with the best cement, or by any other means approved by the Inspector.

Sec. 22. Sinks shall be provided at the inlet of such fixtures, with strong metallic strainers to exclude from such waste pipes all substances likely to obstruct them.

Sec. 23. In no case shall the waste pipe from a bath, tub or other fixture be connected with a water-closet trap.

Sec. 24. Overflow pipes from fixtures shall in every case be connected with the inlet side of the trap, and underneath the water.

Drip or overflow pipes from the safety pan under water-closets and other fixtures, or refrigerators, or from tanks, other than those of water-closets, shall be made to run into some place open to sight; and in no case shall any such pipe be connected directly with the drain, waste or soil pipe.

Sec. 25. Every room wherein there is a water-closet shall communicate with the external air by means of a shaft or duct of at least 3 inches diameter, when such shaft or duct shall not extend through more than two stories, and of 4 inches for a greater number of stories. The ventilation pipes in any tenement where there are two or more lodgings may be united into one pipe of a diameter of at least one inch greater than any one of the single ventilation pipes, when going through the roof.

(2) Ventilation may be made through a flue, provided there be no openings in such flue to rooms above, other than for ventilation of water-closet apartments.

Sec. 26. Every water-closet shall have a cistern supply, and in no case be supplied directly from the city reservoir supply pipes.

Sec. 27. In houses containing one, or more than one tenement, there shall be one water-closet for each family, and a separate cistern for each closet; in other buildings, however, a group of closets may be supplied from one tank; and there shall be at least one water-closet to every fifteen inmates.

In buildings where operatives of both sexes are employed, proper separate accommodation shall be furnished for men and women.

Sec. 28. The overflow pipes from water-closet cisterns shall discharge into an open sink, or the basin of the water-closet, or where its discharge will attract attention and indicate whether waste or water is oc-

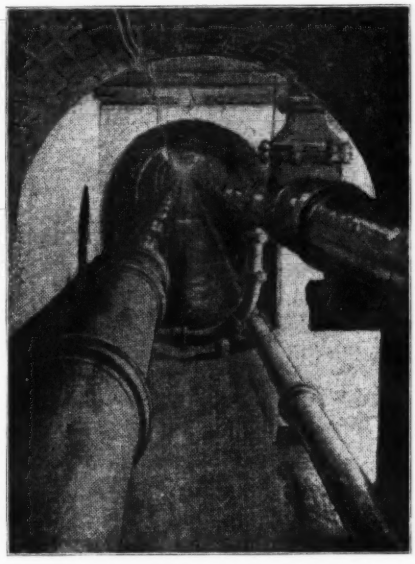
lines, and paving of the street, was carried on simultaneously. The cost of the work has been £7 2s. 4d. per linear yard. This amount includes all the lateral ways and electric lighting throughout."*

A typical section of the St. Helens pipe gallery system is shown in the accompanying illustration.

I am also able to give a perspective view of the inside of one of the St. Helens subways showing pipes in position. This cut, reproduced from the report of Mr. Broom, is not very satisfactory as a picture, but it is the best obtainable by mechanical reproduction.

The people of St. Helens are evidently well pleased with the work. From an account of the opening ceremonies, printed in the *Advertiser* of that city, under date of May 6, 1899, I condense the following:

"On Friday afternoon the members of the Council and the corporate officials made an inspection of the new Church street subway, which has been recently completed. The party descended the subway at the Shaw street end and walked up to the terminus in Ormskirk street, the tunnel being, of course, illuminated with the electric light. There was only room for them to walk in single file, the large 18-inch gas main and the two water mains taking up much of the room. There was ample room as to height, however. After



THE ST. HELENS PIPE GALLERY.
(From a Photograph.)

making the inspection the councillors and officials made their way to the Town Hall, where congratulatory speeches were indulged in.

"Alderman Bishop, as chairman of the Paving Committee, which was responsible for the subway, said he wished to express the gratification of the committee at the presence of the Council. The committee were pleased that the Council should have had an opportunity of viewing what he could not help thinking was a very satisfactory piece of work. He thought it was the feeling of every member of the committee who was present, and as time went on he was sure the town would feel that in making this subway they had done the right thing. They had been almost pioneers in the matter, for he believed there was only one other subway out of London, and that one was in Nottingham. He had no doubt they would find other towns glad to profit by what they had done, though he did not think they would be able to improve on it. He was sure the work reflected great credit on Mr. Broom as the designer of it. The committee also held that the work had been very satisfactorily carried out by the contractors. He only wished to add that, though the Paving Committee had been responsible for the work, they could have done nothing in the matter without being backed up by the other committees and the Council, and it was to the credit of the Council that the town had had the enterprise to undertake work of this magnitude.

"The Borough Engineer, called on by Alderman Bishop to give some

*The cost figure "£7, 2s., 4d., per linear yard ($34.65)" is correctly transcribed from the official publication of Mr. Broom's report. It is unintelligible, as it seems impossible that the work could be built for many times that amount.

curring, but not into the soil or waste pipe, or into the drain direct.

Sec. 29. Valves must be so fitted and adjusted as to prevent wasting of water.

Sec. 30. No privy pit or cesspool for sewage shall hereafter be constructed within the city or any premises situated within 200 feet of any street wherein there is a sewer and wherein the city water is laid; nor shall privy pits or cesspols for sewage, presently existing, be henceforth permitted, after May 1, 1902, to remain in any part of the city where water-closets can be connected with a public sewer in the streets.

Proviso. The Health Department may, however, in exceptional cases, issue written permits for the toleration (during a period not exceeding twelve consecutive months renewable) of privy pits and cesspools for sewage where the nature of the case would make the rigid enforcement of the above By-law a detriment to the public health. In all such cases, the following shall be the method of procedure:

1. The owner or agent of any premises, whereon it is desired to tolerate for a limited period a privy pit or cesspool for sewage, shall file, during the month of April each year, a demand in writing upon the Health Department for a temporary permit, alleging therein the grounds whereon exception is demanded.

2. The premises in question shall forthwith be inspected by an officer of the Health Department, who shall make a written report concerning the same, to the Medical Health Officer upon the following matters:

a. As to the validity of the reasons advanced by the applicant for the exemption from the general law.

b. As to the construction and condition of the privy pit or cesspool for sewage for which the permit is asked.

3. Upon the receipt of the aforesaid report the Medical Health Officer, if, in his opinion, the strict enforcement of this law would be detrimental to health, and if the condition of the privy pit or cesspool for sewage, for which toleration is demanded, is in conformity with the following article, may issue the temporary permit hereinabove mentioned.

Sec. 31. Every new privy pit shall be water-tight, of a capacity of 45 cubic feet; the sides and bottom shall be constructed of cemented brick twelve inches in thickness and well cemented inside with hydraulic cement; such vault may be constructed of cast iron, the shape or form of which shall be either circular or oblong without angles, and with a concave bottom; it shall be provided with a ventilation pipe at least 4 inches in diameter, extending from the pit through the roof sufficiently high as to prevent inconvenience to occupants of neighboring house; the seats shall have a tight fitting cover; it shall have an aperture opening exteriorly to allow of cleaning by pneumatic process, such aperture to be two feet by one and a half feet in size or else the flooring shall be air-tight and shall have a tightly fitting trap-door communicating with the pit; the top of the vault shall be one foot above the level of the ground; nothing shall be put into such pit, excepting human excreta; privies shall be located at a distance of 20 feet or more, should the Board of Health deem it necessary, from any house or street; they shall be emptied when the contents reach within eighteen inches of the top of the vault or whenever the Board of Health deem it necessary; no offensive smell or gases shall be allowed to escape therefrom. But, in no case shall a privy be allowed within a dwelling-house.

(1) In the case of privy vaults now drained into a common sewer, they shall be isolated by means of suitable traps placed below frost and according to instructions from the Board of Health.

details of the scheme, read a portion of the description he had prepared. This was as follows:

"The object of the subway is to avoid taking up the granite street with its concrete foundation for the purpose of relaying or repairing gas and water mains or electric cables. As the Corporation had to repave the streets in equipping the tram lines for electrical traction, the question was brought before the various committees as to whether it would not be more economical and satisfactory, in view of the narrowness of the streets, the number of the mains and the unsatisfactory and costly results of interfering with the surface and foundations of the streets, to construct a subway by which the whole of the works beneath could be inspected and repaired without interfering with the roadway or the traffic. The Borough, Water and Gas Engineers were sent to London and Nottingham to inspect the subways there, and it was found that in them were carried the gas, water, electric light, hydraulic supply and telegraph and telephone cables, all of which it was expected would eventually be found in the St. Helens subway.

"The Borough Engineer remarked at the outset that they were told by various authorities that a subway of concrete would never stand a cart going over it, but in spite of this they had proceeded with the work and successfully completed the same at a less cost than was at first expected. They could not, however, compare the cost per yard with the cost in London, because in the latter place materials were so much dearer and the expense of getting material about much more. At the same time they had got a cheap and substantial subway. He had had the assistance of the Electrical Engineer in carrying out the lighting, and he had to thank him for the help he had given and for having carried out his part of the work so satisfactorily. The job was a very substantial one and would last for many years to come.

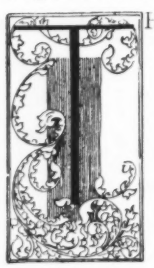
"The contractor said he was highly pleased with the way they had spoken as to the work on the subway. People said at first that the subway would not stand unless it were made of bricks, but he was sure it was stronger in its present form than if it had been constructed entirely of bricks. In the smallest place the concrete was 13 or 14 inches thick, and every inch it gained in strength. The brick arch did not carry the weight, but the concrete did. Councillor Johnson said he was only sorry the Council did not take the bull by the horns and extend the subway down Bridge street, which was very narrow.

"The Deputy Mayor (Councillor Martin) said he that he was only expressing the feelings of the Mayor and the Council when he said the paving committee were to be congratulated on this further march in the municipal enterprise of the borough. There had, of course, been a great many complaints in the town with regard to the upset the work caused, but now it was completed the ratepayers could congratulate themselves upon having a piece of work in their midst which no one else in the North of England possessed."

THE SANIFICATION OF NEW ORLEANS.

By George G. Earl.

[The important town of New Orleans is the only large city in the United States without a system of sewerage and water supply. The introduction of modern sanitary systems is therefore of great interest, both scientifically and commercially. George G. Earl, general superintendent of the work in progress, is particularly well qualified to inform our readers of the progress being made in making New Orleans a sanitary place of residence.—EDITOR.]



THE sewerage system of New Orleans, upon which construction has now been in progress for two months, is intended to receive the fouled liquid water closet waste from every house as rapidly as they are formed, and within one to six hours from the time they enter the sewers to deliver them into the Mississippi River. This requires a sewer on every street and a connection to every house, which the Sewerage and Water Board must make to the property line. These sewers are designed so that they will have flow in them somewhat proportionate to their size, and, therefore, have to be mostly small pipe; 87 per cent of the system, by length, will be 8-inch pipe sewers; the remaining 13 per cent will range in size from 10 inches to 6 feet in diameter, depending upon the area which it drains. These sewers will be found to be just large enough to carry off efficiently, and without nuisance, the dry weather flow which now stagnates and deposits in the street gutters and is washed into the drainage system at each recurring storm.

It will be remembered that an effort was made to let a lot of sewer contracts in August of 1902, and that the bids received at that time (except for pumping machinery, which was awarded) were all considered too high and were rejected.

It will be further remembered that at a new letting in February, 1903, bids aggregating some half million dollars less on the same work, were received, and

(2) In the case of a new house being built, or one already existing being repaired, wherever there is a public sewer in the street, a water-closet shall be put in to the exclusion of privy pits.

(3) When a house is occupied by but one family, if there is already a water-closet in the house, no privy pit shall be tolerated on the premises.

Sec. 32. No steam exhaust blow-off pipe shall connect with a sewer directly, or any house drain, soil pipe, or waste pipe; such pipe must first discharge into a bank or condenser.

Sec. 33. Cellars shall not be connected with the house drain, unless by a branch pipe, and by special permission.

Sec. 34. A sub-soil drain shall be provided when absolutely necessary, and shall be constructed and trapped to the satisfaction of the Department.

Sec. 35. No trap shall be permitted between the house drain and the public sewer, unless otherwise decided by the Board of Health, in which case such trap shall have a head-hole for cleaning purposes and a fresh air inlet pipe, the whole as may be decided upon by the Department.

Sec. 36. Drains in yards shall, in all cases, be trapped below frost, that is to say: four feet at least under ground.

Sec. 37. The inspection of drains on private property shall be under the exclusive control of the Department.

Sec. 38. Gas companies are obliged to place a stop cock to every main pipe.

Sec. 39. Any person contravening any of the provisions of these By-laws, shall be liable to a fine with or without costs, and in default of immediate payment of the said fine with or without costs, to an imprisonment; the amount of said fine, and the term of said imprisonment to be determined by the Recorder's Court, at its discretion; but the said fine shall not exceed forty dollars, and the term of imprisonment shall not exceed two calendar months; the said imprisonment, however, to cease at any time before the expiration of the period fixed by the Recorder's Court, on payment of said fine or fine and costs; and where the infraction is continuous, such infraction during each day shall constitute a separate offense.

SWEATING PIPES AND FIXTURES.

(Written for DOMESTIC ENGINEERING.)

No doubt every plumber has at some time in his experience been called upon to give advice regarding the sweating of pipes and fixtures, and in some instances to look for an alleged leak where, as a matter of fact, none existed.

In this connection the writer remembers a case where a lead closet trap and the connections were supposed to be leaking, and had damaged the ceiling underneath several times. Three or four different plumbers had failed to discover the cause of the difficulty, which really lay in the fact that the ball cock was leaking slightly, thereby keeping the water in the trap constantly cold, and as there was a free circulation of air around the outside of the trap, the moisture was deposited upon it. The cure was to fill the space surrounding the trap with sawdust to prevent contact with the outer air, and, for the sake of economy in water, to repair the ball cock.

If the plumber has an accurate knowledge of the cause of "sweating," he will be better able to deal with individual cases as they come under his notice, and therefore the writer deems it well to give the following explanation: Very cold air has absolutely no power to carry moisture, while very warm air can carry a surprisingly large amount of it; and so, in the degree of heat in the atmosphere will de-

that six out of the eight bids so received were accepted by the Sewerage and Water Board, two being still rejected as too high by advice of the Engineering Department of the Board, who realize that there is no money to squander in awarding contracts at prices greatly in excess of what they believe to contain a fair margin of profit if the available funds are to cover the required work.

The results of the construction thus far are favorable to the belief that somewhat lower prices than those now ruling would still have a very handsome margin of profit, but with contractors naturally vieing with each other in spreading tales of woe, and with the people of the city themselves always ready to corroborate any kind of a story about underground lakes of water or quicksand, or stumps, or other difficulty, it is small wonder if contractors from abroad put a few extra per cent on their prices to guard against the ghosts so raised.

Excavations in New Orleans, considering the low level of the city, have always been wonderfully free from any large amount of underground water, and the drainage and other constructions of later years have reduced this small amount of water so that the contractors who bid high, allowing all kinds of prices to cover every conceivable difficulty in water, quicksand and endless cypress stumps, can now any day see as fine a lot of trenches as one could desire. Some of them have too little water to make a pump available at all; some of them have no sheeting from top to bottom, others have the most skeleton form of sheeting; others again are fairly close-sheeted where sandy material exists. Certain areas show stumps in plenty, but the force account of cost on the very stumpiest trench is by no means alarming.

All of the sheeting is placed with the excavation;most of it is removed as the trench is backfilled. Usually the sewer is being laid on the natural trench bottom; occasionally a softer natural bottom necessitates the use of plank and cinder or gravel re-filling over same to properly bed the sewer. In other words, it is, for the most part, just good, easy construction, in the hands of contractors who know their business, with an occasional difficult section and enough chance to go expensively wrong to make it risky work for greenhorns in the sewer business.

In the matter of

WATER WORKS CONSTRUCTION.

the Sewerage and Water Board has not as yet made any actual start, nor has the board definitely determined whether it will not acquire the existing water works plant. The board has, however, determined to use Mississippi river water, taken at the upper end of the city, as the source of a water supply, and has conducted a very careful investigation as to how best to purify this water.

In order to purify 40,000,000 gallons per day of Mississippi river water, to provide room for pumping machinery, reservoirs, filters, etc., about ten squares of ground are required, and, as the city grows, a larger area will be necessary; so the board has directed the immediate acquirement of some twenty-six squares, or about sixty-five acres of ground inCarrollton for this use. When this is acquired, and the legal aspect as regards the existing water works franchise is pronounced to be satisfactory, the Sewerage and Water Board can advertise for pumping machinery, reservoir and filter contracts, since all of these must be in service before a distribution system of water works can be supplied with a clear-water supply.

The above named contracts would take about three years for completion, and during the latter part of that time energetic work should be started on the construction of the water distribution system, in the execution of which rapid work, and more especially rapid expenditure, are possible. Up to this time prices of cast-iron pipe have been prohibitive, and much large water works construction in other cities has simply waited for lower prices. The pipe market is now on the down grade, and it is fair to presume that by the time the Sewerage and Water Board will be in the market fair prices will prevail.

The proposed method of water purification has been so often described that it seems hardly necessary to cover it again, but for the benefit of outside readers, it may be well to say that the Mississippi river water carries anywhere from one to five or six tons of very fine suspended matter to every 1,000,000 gallons of water, averaging probably 2.7 tons.

Much of this suspended matter is so very fine that no reasonable period of plain subsidence will eliminate it, and no system of filtration which is practicable within reasonable cost limits will altogether remove it in its natural state In other words, there is no subsidence or filtration or combination of these two, which can be practically applied in a large water purification plant to the local river water.

It has been known for years, however, that certain substances, when introduced into the water in very small quantities, tended to alter the condition of the fine suspended matter, bringing the particles together in larger aggregates and through which the water may pass; these substances are known as "coagulants."

pend the amount of moisture carried. Therefore on a hot summer day (when cold pipes always sweat most) the warm air, heavily charged with moisture, comes in contact with the cold surface of the pipe and is chilled, thereby losing its power to carry moisture, and what is more natural then that the moisture should be precipitated on the surface which condensed it? which in reality is exactly what takes place.

Now, to the remedy. Simply cover the pipe, so that the warm air cannot get at it. Good asbestos, mineral wool, hair felt, or even common paper, if put on thick enough, will furnish the cure.

In some cases covering with a bulky substance is, because of its appearance, objectionable, and the difficulty is overcome, though in a somewhat more expensive way, by covering the pipes with a light metal casing, having the ends sealed tightly so that there cannot possibly be a circulation of air between the casing and the pipe, the "dead air" between the two forming a perfect non-conductor.

Before closing, reference might be made to the constant trouble found with low-down closet tanks.

It is a most remarkable thing that both manufacturers and plumbers have made and used, and are continuing to make and use, these tanks with woodwork as open as possible, thereby encouraging a circulation of warm air downward through the space between the copper lining and the wood, instead of making them perfectly tight from top to bottom, like the older style high up tank, which never gave any trouble in this regard.

A slight knowledge of physics, and a free use of our "thinking apparatus" would often save us a good deal of needless expense and worry in matters of this kind.

M. J. Q.

EDITORIAL NOTES.

It is announced from Washington that organized labor will boycott the president of the United States, if he declines to accede to their demand for the dismissal of Miller, who was reinstated in government employ; and the recognition of organized labor. This means, of course, that none but members of the union shall be employed by the government in any of its various departments. The president has ordered that no discrimination shall be made in the employment of government workers. The Central Labor Union has sent out circulars to over five hundred unions, calling attention to the position of the president, with a view of opposing his re-election unless he bows the knee to this new oligarchy. Thus the issue is being joined all along the line.

It is perhaps well that the question should be settled at this time. No question can ever be settled until it is settled right. TheAmerican people are long-suffering, but when they do move they move with irresistible power. They endured the tyranny of Great Britain until it was no longer bearable, when they burst their bonds for all time. The nation endured the tyranny of the slave holders until patience ceased to be a virtue, and finally asserted its independence, although at a vast expenditure of blood and treasure. Now we are confronted by a tyranny infinitely worse, one which seeks to dominate every avenue of business, every effort of human ambition, every act of our lives, public and private. Every person from president down to the humblest citizen is required to surrender his individual liberty of action at the behest of organized labor. It is time that the American people should awake to the enormity of the demands made. There seems to be a settled determination throughout the country on the part of the unions to rule all manufacturing and other industries, or to ruin both employer and em-

Mustard seed, peach kernels or almonds and certain compounds of lime, iron and aluminum all have this property. By using any of them freely really spectacular results are obtained in the rapid subsidence of suspended matter. The amount of any coagulant required, however, is a function of the nature and amount of suspended matter to be removed by it, and also of the time during which it can be allowed to act; and the water purification investigation was mainly to establish for New Orleans the economical limits and conditions applicable to this function for the local river water.

A year's operation in the treatment of nearly 100,000 gallons a day of river water demonstrated that twelve hours of plain subsidence, prior to coagulation, was more economical than immediate coagulation of the raw water, but that any longer period of plain subsidence would not pay for its cost in saving of cost of coagulation. It also demonstrated that to produce the reduction of turbidity (or suspended matter) to the limit desirable for economical filtration, with the least possible use of coagulation, a twelve-hour period, during which the coagulant can act in causing subsidence, is cheaper than the extra coagulant required to effect the same result in a shorter time. The coagulant which is now intended for use at New Orleans is sulphate of alumina, which is usually used in other similar systems and is considered the cheapest, best and most efficient. Any other coagulant, however, which may prove more desirable would be equally available and could be substituted instead, including that which is created electrically by the decomposition of various metallic electrodes. Several systems involving this last named process are now being actively promoted. At Louisville such systems were investigated and in the state then presented were not found economical, but should an economical system of this character be developed there is no reason why it could not be applied in the system proposed for New Orleans.

Briefly, then, the water purification system will be as follows:

First—Twelve hours of plain subsidence, (2nd) then coagulation, (3rd) then 12 hours of auxiliary subsidence, (4th) then rapid filtration through sand, which will remove the last remnant of suspended matter and yield a perfectly clear, sparkling water of a satisfactory hygienic quality.

This water will be sent under a direct pressure equal to about a 200-foot head into the distribution system of water mains, and it is intended that at least 100 feet of actual pressure shall be always available in every part of the city.

The facts which make water, sewerage and drainage especially expensive in New Orleans are:

First—The great area to be covered in proportion to the population.

Second—The almost level character of that area, requiring three pumpings before water enters the water works distribution system, and several relifts by pumping in both sewerage and drainage systems, and

Third—The very great rainfall which makes it necessary to have drainage channels for any given area several times larger than any other city in the United States would have, and, of course, pumping capacity in proportion.

A HANDY CHART FOR THE USE OF PLUMBERS.

SOMETIME ago, a member of the plumbers' craft asked the writer if there was no way of determining the length of pipe necessary to run diagonally across a corner in the case of making an offset, without resorting to the unsatisfactory "cut and try" method. Suppose, the plumber says, one of my men sent out on a job finds that he must run the vent pipe outside the house and must of necessity make an offset for the eaves. To save pipe, he measures diagonally from the eaves to some point on the side of the house, which he considers about right, for he desires to use 45 degree L's, cuts his pipe according to this measurement and then proceeds to try to fit it. Nine times out of ten he learns that his piece of pipe is either too long (which is usually the case) or too short, which causes him to go back to the shop or wherever he may have the tools to make the change needed. All this takes time and may be a source of waste of pipe and naturally a little human energy. If there is some way of finding the proper length of a pipe without taking all this time and trouble, it would be quite a saving.

The above inquiry brought forth the reply that the problem could be easily solved, and that the solution was based upon the principle used in computing right angled triangles, that is three sided figures having a "square corner." In this particular case, the two sides forming the right angle (square corner) shown in the figure as BA and CA, are equal, which makes the problem simpler than it would be if AB, for instance, was longer than AC in finding the length from B to C. To illustrate, let us take a familiar case, at least to the carpenter.

ployc. It is estimated that in new buildings alone, the vast sum of $500,000,000 has been deterred from investment by the impossible demands of labor unions. Men will no longer invest their money in enterprises which the unions will not permit them to manage. If the country is to have a reaction from its present high prosperity, it will be brought about by the unreasoning demands of the unions. Then they will have leisure to consider what they have gained by killing the goose that laid the golden egg. In the meantime it will be interesting to watch the effect of their arrogant threats upon the President.

* * *

"If anyone thinks the position of a plumbing or tenement inspector to be a sinecure, I would like to have him make the rounds with one of my men for a day," remarked Andrew Young, chief inspector of the Chicago Board of Health. "In the first place, there are only twenty-one men on my staff, when there should be at the very least thirty-five—one for each ward. One of my men in an outlying district has a territory of at least twenty square miles to cover. Another in quite a thickly populated district has about ten square blocks. Now what can you expect? We receive a complaint from a tenant. An inspector goes out there and finds no one home. The next day the complainant comes down here and raises a howl because we have paid no attention to his request. An inspector is notified that a plumbing job is completed. He appears on the scene ready for the test and is asked to put it off until water can be got into the pipes. More delay and loss of time for the inspector. We need more men and need them bad. The supplying of this need would mean greater protection to the public health and certainly more work for every master plumber in the city."

* * *

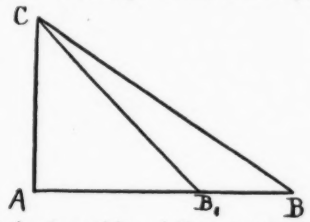
"If business men would only exercise a little care and vigilance they would find it too easy to detect many a swindle and aid the government in apprehending the culprits," said Mr. Kimball, of the legal branch of the Chicago Post Office Inspection Department. "If I were in charge of a large wholesale or manufacturing business I should scrutinize very carefully an inquiry or order which came in signed by rubber stamp with such a name as the 'Podunkville Supply Company,' for instance, with no other signature, no initials or individual name; no 'per.' A thing like this would be sufficient to arouse my suspicions at once. Then again, if I had reason to believe that there was something wrong with a firm which had entered into correspondence with me I would be very careful not only to preserve the letters, but the envelopes as well as the latter are invaluable to the government in proving illegal use of the mails. Finally, should I, in spite of all precautions, find myself taken in by some shrewd impostor, I would gladly take the time to travel to a distant city if necessary in order to give my evidence in the case. This I would consider a duty because of my citizenship and because of my intimate relation to the business community."

* * *

It is rather to be hoped that merchants in other sections do not become afflicted with the same mania as dealers in the upper peninsula of Michigan. Haven't made money and lost as much more probably in speculating in stocks of copper properties in their section, they are all with one accord taking a whirl in the Arizona Calumet stocks. They are doing this in many instances to the impairment of their individual credit—just naturally tying up their surplus and in some instances a large slice of their legitimate business capital by reason of their childlike faith in the mine copper output of the far-off territory.

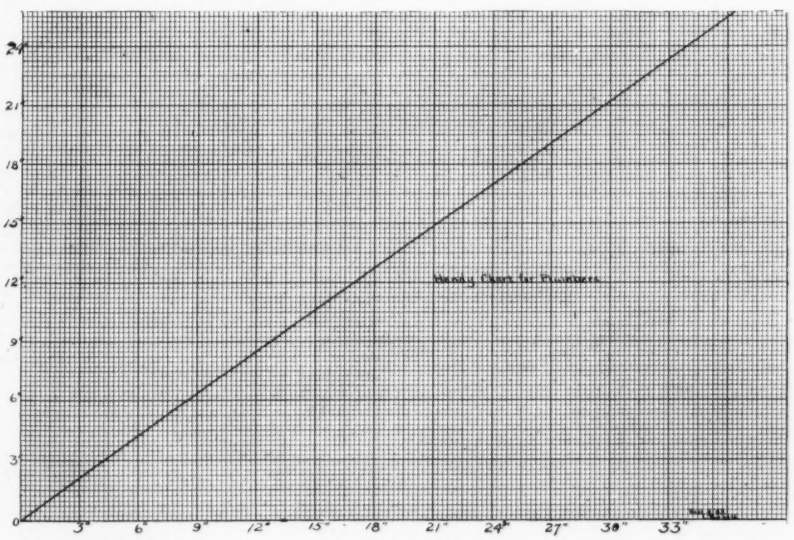
Suppose AB to equal to 4 inches and AC, 3 inches. It is well known that BC equals 5 inches. But how is this result obtained? It is obtained as follows: Multiply 3 by 3 (equals 9), multiply 4 by 4 (equals 16), add the results 9 and 16 (equals 25) and extract the square root of 25, which gives 5. In other words square each of the two sides AB and AC, i. e., 4 and 3, add the products and extract the square root of the sum, i. e., 25, which equals 5. It might be well to remark in passing that 5 is the square root of 25, because 5 squared or multiplied by itself equals 25.

Returning now to the plumber's problem, all he needs to do is to measure the distance from the side of the house to the outermost edge of the roof and he has all the measurements necessary. That is to say, measure the offset, and



he obtains the length of the two sides, AB and AC, from which he may solve the problem without any guessing. Having found the square of BC as above indicated, he can easily get the value of BC by looking up its square root in any of the many handbooks for mechanics now published.

To avoid this squaring and looking up books, etc., the accompanying chart has been prepared for any who may have occasion to use it. To illustrate the use of the chart, let us take an offset of 17 inches. Along the left hand margin are numbers representing distances from O, each large square representing 3 inches, each small one ¼ of an inch. The same is true of the margin along the bottom of the chart. To find the length of pipe to be used in connection with an offset of 17 inches, count downward from 18 inches at left margin, four small squares and follow this line to the right until it crosses the line OL then follow the vertical line downward from this point to the margin at the bottom, where the number 24 inches is found as the proper length of pipe for an offset of 17 inches. This gives an error of about one-tenth of one per cent, or four one-hundredths of an inch. For an offset of twelve inches, we may trace in the same way and find 17 inches as the result.



If thought to be easier, any one might find on the chart the lengths corresponding to the offsets he most frequently has to deal with and tabulate the results in a small space for carrying in the pocket, while the chart may be pasted to a piece of cardboard and hung up in a convenient place in the shop, where it is hoped it may serve as a time saver.

It might be well to add, by way of explanation, that the lengths determined from the chart apply to the center line of the pipe, so that the ends of the diagonal BC in figure will terminate at the middle of each of the two elbows. By making proper allowance at each of these elbows, there should be no difficulty in getting the right length of pipe for use at offsets of this kind.

L. BURNETT.

It is hardly good business policy to neglect the little business gold mines capable of development at home because of an undue interest in mines of the baser metal elsewhere.

* * *

It is one thing to perpetrate a little real humor in advertising and quite another to indulge in a stale species of fake. For instance, "Strike Notice" is the flaming headline of the street car announcement of a Chicago real estate concern. "Strike for a home" the announcement continues and then gets down to business.

Now this created a very unpleasant impression on the mind of the writer. Pure fake and nothing else also rather inadvisable perhaps, in view of present conditions in Chicago. Still a man in one set of environments cannot always judge of the effect produced on those in another position.

Of an entirely different character, however, was the clever sign of Tom Murray, which covered the front of his store during alterations and additions to his place of business and the consequent special sale "Pushed to the Wall" it read in large letters "and going through" in small. There was an element of humor in this that appealed to everybody and lent such force to Mr. Murray's other work in this line as to enable him soon to publish a book of blue pencil window cards for which he was able to get five plunks per copy.

* * *

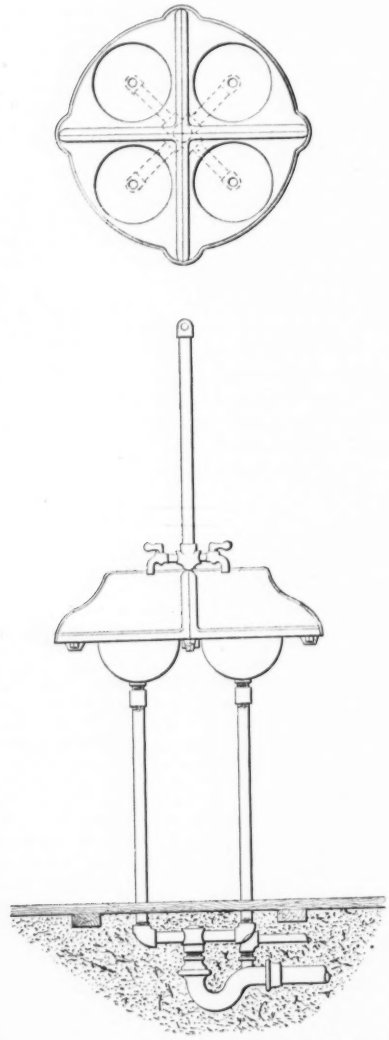
Another great sacrifice has been made to sanitary science. Menotti Garibaldi, patriot son of a patriot father, whom he followed with the flag which made a united Italy, is but recently dead from malarial fever contracted on the Roman Campagna. One of the most noted plague spots of the world is that strip of land lying between Rome and the sea, stretching for ninety miles from Civita Vecchia southward to Terracina, varying from twenty-five to forty-five miles in width, and at one time densely populated and thoroughly tilled. For a thousand years it has been a dreary waste, the miserable people who were so unfortunate as to be compelled to live there, leading fever-stricken lives, unwilling sacrifices to an undrained, insanitary country. Believing this fever land could be made healthful, Menotti Garibaldi became enthusiastic in an enterprise which had for its object the reclamation of the Campagna, where, on a soil naturally rich, a million inhabitants of overcrowded Italy might find homes in a land made livable by sanitary engineering. He interested the government and vast drainage and irrigation schemes were inaugurated; eucalyptus groves were planted; estates were placed under cultivation, one of them being that of Garibaldi himself; gradually the district is being sanified and some day Rome will again have a vast population between her and the sea, and the fever wind will never again be feared in the Eternal City. But the heroic man who conceived it all contracted malarial fever and has passed away, giving up his life in order that life more abundant could be the possession of others.

* * *

The regulation of plumbing by municipal authority has come to be considered a perfectly rational method of putting into action the police power of a community for the preservation of the health or safety of the public. Bad plumbing is a menace to good health, and when the public health is endangered public sentiment usually approves the measures taken by municipal authorities to protect it. It is not surprising that plumbing regulation is found more frequently in towns containing more than the average wealth and intelligence, because people possessing knowledge and means understand the necessity of having good

A COMPACT AND INEXPENSIVE LAVATORY.

FACILITIES for washing up after work are now provided in planning every up-to-date shop; the day of the individual pail of water is near its end. Not every manufacturer feels it necessary to furnish complete bathing fixtures, as is done by some advanced managements, and the majority must be content with supplying plenty of water and clean sinks into which it may run. The ideal arrangement for washing hands and face is undoubtedly a continuous stream of water warmed to a comfortable temperature, rather than any form of basin containing water which is soiled at the first dip. It happens that there is actually less water required for a minimum stream large enough to make washing quick and easy than for the two or three fillings of a wash-bowl necessary for cleaning the machinist's hands satisfactorily. This has been experimentally proven and is easily tried by anyone who may be skeptical.



Arrangement of Group of Lavatories.

In locating the wash-bowls in a shop lavatory the chief problem is compact arrangement. Washing is done by the entire force of men at one time, and the room at other times is practically empty and waste space. It is not possible to place bowls nearer than about 30 inches center to center without making washing by men at every bowl too inconvenient. Wall space is often wanted for lockers. The arrangement of bowls in groups in the center of the room allows the adoption of a simple and cheap type and arrangement of fixtures.

The corner wash-bowl of white enameled iron is made in one piece, and is the cheapest of all forms regularly listed. Four of these bolted together with $\frac{1}{4}$-inch stove bolts through the ears provided for the usual attachment to the

plumbing and are able to have it. It is therefore more than a surprise to learn that the sun-kissed city of Pasadena, Cal., a city of intelligent and well-to-do people, is rebelling against a plumbing ordinance. When the measure was put into effect some time ago a commission was appointed to determine if the cost of plumbing would be increased by the new legislation. If we mistake not the finding of this commission was that plumbing should cost no more under the ordinance than before it was enacted. But the ordinance has become so unpopular that a petition has been circulated asking that it may be voted on at a special election. So far as we are aware this will be the first time, in case a special election is held, that a plumbing ordinance has been submitted to the people to be directly voted on. We are glad there is some prospect that it may be brought before the people, but we sincerely hope the citizens of Pasadena will not be so blind to the welfare of their beautiful city as to reject the regulation of plumbing. It is a very necessary requirement if good health is to be preserved.

* * *

D. M. Parry and those who follow him intend to have peace if they have to fight for it. Representatives of practically every large employers' association in the country met in secret session recently in Chicago and organized a national body, the avowed purpose of which is to cope with union labor and to promote the interests of employers and independent workmen. Under the leadership of President D. M. Parry of the National Manufacturers' Association, those present framed up a temporary organization and made arrangements for a general meeting in this city late in October. The officers of over 600 employers' organizations, estimated by the promoters to represent several billions of capital, will be invited to attend. The new association has chosen the date of its general meeting as near to that of the National Civic Federation as possible, in order to overcome whatever effect that gathering may have. By many of the employers the federation is considered to be antagonistic to the business interests. The new association will differ materially from the federation. It will not adopt the peaceful methods, but proposes to have a defense fund of $1,500,000 ready to fight organized labor when it becomes hostile. Organizers will be sent out to form subsidiary associations in every manufacturing and business center of the country. A bureau of education and a legal bureau form a part of the plan. The new organization will oppose every effort to enact arbitration laws when the existing statutes will serve the purpose, and above all will preach the doctrine public opinion can bring an end to labor's so-called tyranny. "It is the intention of this association to choke off the inclination of organized labor to conduct the business of this country on an unlawful basis," said Mr. Parry. "It is our intention to throw a safeguard about the non-union workman and the man who desires to work for his own interests and for whom he pleases."

Septic Tanks Sewage Disposal.

Vancouver is one of the few western communities too modest to let the world know wherein it leads the world, says *The World*. Take the septic tank method of sewage disposal. How many Vancouverites are aware that this is one of the very first cities to thoroughly test this system and to demonstrate in practice its marked superiorities? How many know that the eyes of all America's engineers have been turned hitherward to see how the septic tank works in the accomplishment of what has been claimed for it by its inventors?

wall make a cheap four-divided wash-stand, and the groups may be spaced 54 inches center to center and yet leave plenty of room all around. When these bowls are all in use, inspection readily shows that there is practically no unoccupied floor space, and that each man has plenty of elbow room just where he needs it.

Such a group of bowls is most cheaply and conveniently connected and supported, and trapped into one fixture, the trap coming just within the distance required by usual plumbing regulations. It is only necessary to provide for each bowl a 1-inch coupling tapped to fit the regular waste connection at one end. From this coupling a 1-inch pipe leads down to below the floor level, where a 1x1¼ elbow and 1¼-inch nipple connects into one opening of a common 1¼-inch railing cross. The central opening of the cross is connected by a nipple and leaded and calked joint into a 2-inch cast-iron horizontal trap. The 1-inch pipes make excellent standards, supporting the group of bowls, so that it is hard not to keep the floor clean by sweeping with a broom.

Water is brought by a line run on the ceiling over the centers of the groups of bowls. A drop pipe leads down just over the center of each group, there terminating in a ¾-inch railing cross, from each arm of which leads a nipple carrying a ¼-inch bibb cock. Under city pressures ⅛-inch cocks would be quite large enough.

This arrangement has been carried out in fitting up the washroom of the Brown-Cochran Company's (Lorain, Ohio) machine shop. In this case a plentiful supply of warm water is provided without expense to the company by piping the waste water from the jacket of the gas engine which operates the shop machinery into an open tank carried on the floor above the washroom and connecting this tank to the supply line. The jacket water leaves the engine at about 130 degrees, and reaches the bowls at a very agreeable temperature. The pet-cocks are allowed to run freely, and even then do not pass all of the waste water, there being a good supply ready at all times for the water closets which are connected to the same tank. As gas engine jacket water is a considerable item in the case of large engines, its use for another purpose affords a saving of some little value, and provides the most desirable feature of a continuous supply of comfortably warm water at all hours of the day without fluctuations of temperature which occur when water is heated by steam in the usual way.—S. H. Bunnell in *American Machinist.*

In connection with the sewage disposal system of their city, Vancouverites have really to go abroad to learn. Scarcely one among the engineering magazines of continental prominence is there found which does not pay tribute to Vancouver's enterprise in showing the way of progress in this municipal institution.

Many are there among the great medical journals that are equally appreciative in their expressions as to Vancouver's enterprise.

And yet Vancouverites scarce give the septic tanks a thought. It never strikes their various reception committees when such a body as the Imperial Chamber of Commerce delegates visits the city that the new and modern plan of disposing of sewage may be even more interesting to some of them, as students of municipal problems, than the picturesque park.

The septic tank system, it may be said for the benefit of many citizens as well as visitors, has in this city proven a conspicuous success. It has indeed proved so satisfactory that the authorities have decided to erect three additional tanks next summer; the plant as thus enlarged being able to handle all the sewage of the city.

Not a single one of the hundred threatened complaints has been received with respect to the working of the system. Its first cost is comparatively small, its maintenance is inexpensive, and it does its work perfectly, promoting the public health and benefiting the city financially at the same time.

The continuous and straightforward advertising of an article is a pretty good guarantee of the article's merit and worth.

When you're buying—buy a well-known, well-advertised article. It is the right way—the safe way.

"A Tower of Strength"

Plumbers' Logic

¶ Fortune follows success.
¶ Success demands good work.
¶ Good work needs good materials.
¶ The best materials of their kind are

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SOLDER, INGOT METALS,
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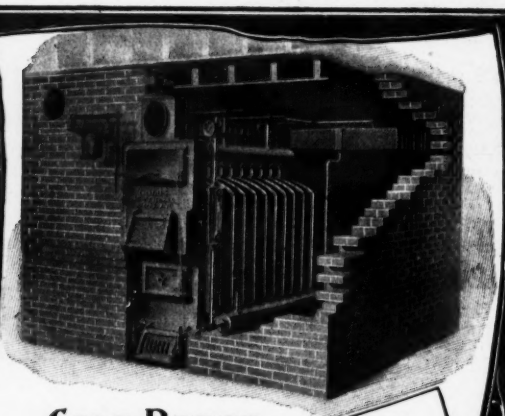
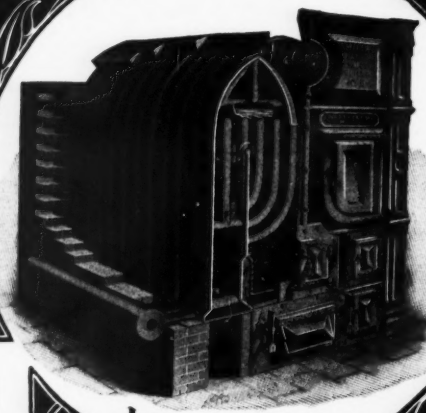
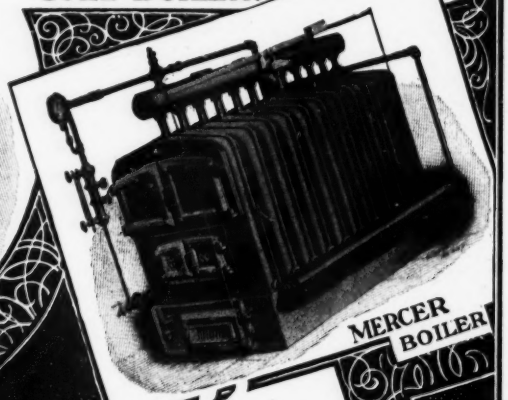


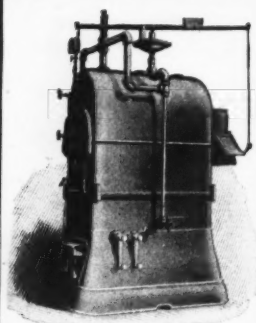
GOLD BOILER.



MILLS BOILER.

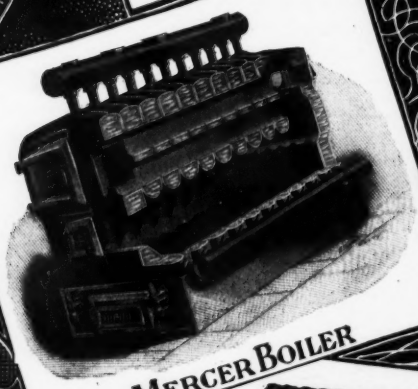


MERCER BOILER



COTTAGE BOILER

MENLO HEATER

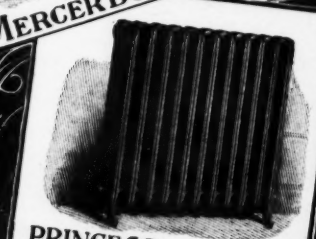


MERCER BOILER

COTTAGE BOILER

PACIFIC COAST AGENTS.
HOLBROOK MERRILL
& STETSON.
San Francisco. Cal.

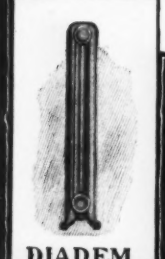
X-RAY



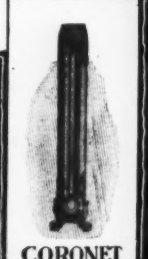
PRINCESS

GOLD PIN

SCHOOL PIN

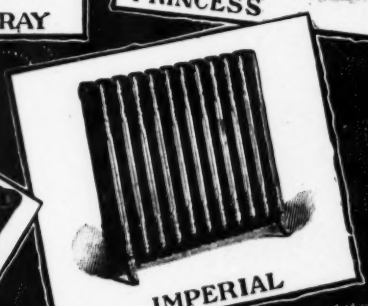


DIADEM



CORONET

EUROPEAN
AGENT.
AUG. EGGERS.
BREMEN & NEW YORK CITY.

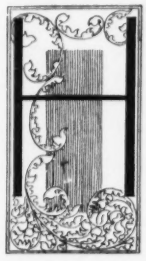


IMPERIAL

Nature and Characteristics of Latent Heat.

By C. Wadsworth, Scranton, Pa.

Introductory Definition and Explanation of Nature of Heat.



HEAT is a form of energy that may be converted into other kinds of energy; conversely, other kinds of energy may be converted into heat. Wherever there is heat some other kind of energy must have been expended in producing it; and when such heat ceases to exist, its equivalent in some other kind of energy replaces it.

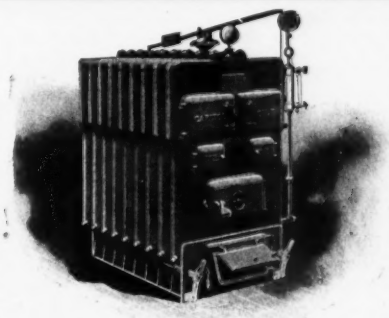
A bar of cold iron may be made very hot by repeated blows from a cold hammer, the heat developed being due to the conversion of the energy of motion of the hammer into energy of heat. Each time the descending hammer is stopped by contact with the bar of iron on the anvil its energy of motion, the moment the blow is struck, is converted into a new form and exists as heat. In fact, the energy of motion of the hammer is transferred to the molecules of the iron bar, and these molecules may then be said to be swinging about with a certain degree of activity through indefinitely small spaces. This motion of the molecules constitutes what we call the heat of the bar. As the blows

Calcutating Sizes of Furnaces.

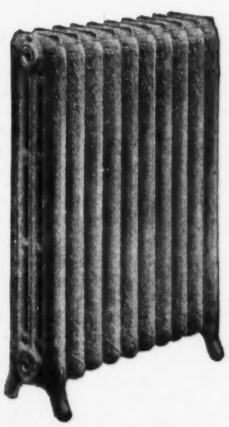
From the purchaser's point of view, to "try 'em before you buy 'em," is a rule that has in many instances given, and, under certain conditions, will probably continue to give, a degree of satisfaction in selecting furnaces that can, perhaps, be obtained in no other practicable way. The decidedly unsatisfactory and oftentimes expensive character of this "trial" method to the furnace dealer, however, whose goods in consequence thereof are frequently unjustly condemned and removed, is ample warrant for carefully determining the proper size or required capacity of furnaces before they are installed, so as to insure undeniably satisfactory results in heating and thereby avoid giving the purchaser an excuse for delay in paying for the apparatus.

The prime requisite in any system of warm air heating is that the furnace shall be capable of heating enough air to such a temperature as will insure a comfortably warmed building in the coldest weather, the duration of which may, perhaps, be comparatively short. Of equal importance is the

CAPITOL
Boilers and Radiators



Capitol Boiler. 98 Series Type Steam.



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"Florentine" Design

The busy time is upon us.
We are in a position to serve the busy man. Send us your RUSH orders for BOILERS and RADIATORS and note results.

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SALES AGENTS:
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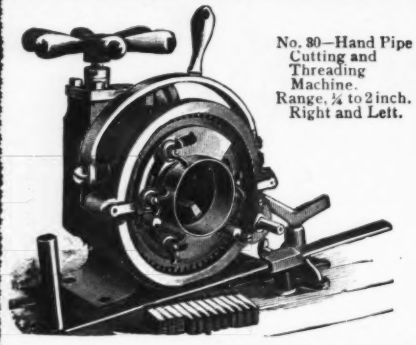

No. 80—Hand Pipe Cutting and Threading Machine. Range, ¼ to 2 inch. Right and Left.

SAVE TIME AND LABOR. WITH A

FORBES' PATENT DIE STOCK

and one man you can cut off and thread a 12-inch pipe with ease. Smaller sizes proportionately easy.

Ratchet Drills, Ratchet Die Stocks, Malleable Iron Pipe Vises

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18 GARDEN ST., BRIDGEPORT, CONN.

of the hammer are repeated, the motion becomes more and more energetic, and the bar gets hotter and hotter. If, on the other hand, the bar is left to itself, the motion gradually becomes feebler, and the bar becomes colder. It is apparent, therefore, that heat is a kind of energy that consists of a more or less active motion of the molecules of the hot body; whereas, according to the old theory that prevailed very generally down to the close of the last century, heat was a kind of matter, conceived to be a subtle and elastic fluid, without weight, which could be added to a body, or taken away from it, by various means. If it was added, then, as a general rule, the body became hotter; if it was taken away, the body, as a general rule, became colder. The advocates of the latter theory, however, experienced some difficulty in demonstrating it, because it was not easy to explain where the subtle fluid came from, each time that the hammer struck the iron bar. They suggested that the heat thus developed already existed in the iron bar, but it was not sensibly felt because it was hidden in some way between the particles of the mass, and the effect of the blows was simply to force it out and make it sensible.

Various experiments by Count Rumford made it apparent that, if heat was a material substance, the quantity of that substance contained in a given mass and capable of being squeezed out of it by any process, must be limited; whereas, if heat be due to movement of the molecules of the mass, then the extent of the motion and the quantity of heat generated must depend simply on the quantity of energy expended in producing such motion. The supposition that heat was a kind of matter had to be abandoned in favor of the suppo sition that heat is a kind of motion.

With a view of exhibiting this phenomenon in a striking light, a hollow copper cylinder or tube, say three inches long and half an inch in diameter, may be mounted on a table in such a way that the tube may be rotated rapidly by means of a belt attached to a large wheel. Pour a little water into the cylinder and then cork it up. Next take two oak boards, fastened together at one end by means of a hinge, and place them round the copper cylinder, grasping it between the two semi-circular grooves cut on the inside of the boards. Now turn the large wheel so as to rotate the cylinder between the oak boards, which are pressing against it. A portion of the energy required in overcoming the frictional resistance offered by the boards to the free movement of the tube is transformed into heat, that passes through the metal of the tube and is absorbed by the water within it. At the end of about two minutes, the water begins to boil, steam is formed within the cylinder, and the cork is driven out with a sort of mild explosion, followed by a puff of steam.

Where did the heat come from that boiled the water in this experiment? Those who used to think that heat was a kind of matter could only say that this matter must have been there from the beginning; that it was hidden, at first, in the little spaces between the molecules, and that it was then squeezed out by the pressure of the oak boards. But the modern theory of heat explains that the muscular energy expended in turning the wheel has been converted into the energy of heat in the copper cylinder. The rotating motion of the cylinder, according as it was checked by the resistance of friction, was converted into a motion of its molecules and this motion of the molecules was itself the heat of the cylinder, and passed, in due course, from the cylinder to the water it contained.

The above described experiment brings out the fact that a small quantity of heat is the equivalent of a very large amount of muscular energy; a truth illustrated every day when heat is itself employed as a source of mechanical

matter of securing a uniformly satisfactory distribution of the heated air, thereby obviating uneven temperatures throughout the building; while the quality of the air passing over the furnace and into the rooms warrants careful consideration in the relation to the design and general features of construction of the furnace.

When a furnace is in use the outer air is colder than that within the building, and since nature requires that the temperature of adjacent bodies in the same media shall gradually become equal, a certain amount of heat is transmitted through the walls of the building to the other atmosphere, in which the heat is diffused, or, in other words, lost in nature's effort to establish an equilibrium of temperatures. The loss of heat from buildings is due to direct transmission by conduction, at varying rates, through walls, windows and other exposed surfaces and by escapement with the air whose flow is necessary to secure proper ventilation.

Not only must the surface be large enough to heat the required amount of air, but it should possess sufficient heating capacity to compensate for these losses, the extent of which cannot be accurately determined, but must be approximately computed when selecting a furnace to meet certain requirements. As an illustration, let it be assumed that a detached eleven-room residence is to be heated by a hot air furnace, whose size is to be calculated approximately to meet local conditions. Assuming that there are 26 windows, the average area of which is 12 square feet per window, it is evident that the total area of exposed glass surface is $26 \times 12 = 312$ square feet. Furthermore, assuming that the building is of ordinary frame construction and not unduly exposed, with about 2,700 square feet of exposed wall surface, then 4 square feet of such wall surface may be taken as being equivalent in heat transmitting (or losing) capacity to 1 square foot of glass surface. In other words, $2{,}700 \div 4 = 675$ square feet of what furnace men call *equivalent glass surface*. To put it in a different way, the walls of the building would allow about as much heat to escape as would 675 square feet of window glass. Evidently the total exposed glass and equivalent surface is, therefore, $312 = 675 \times 987$ square feet.

In determining the size of a furnace it is also advisable to calculate on four changes of air per hour during extremely cold weather, not necessarily to insure ventilation, but to get good results in heating. Furnace manufacturers, however, generally base their ratings on two changes of air per hour, and in expressing the capacity of their furnaces it is customary with them to do so in terms of the cubical contents of

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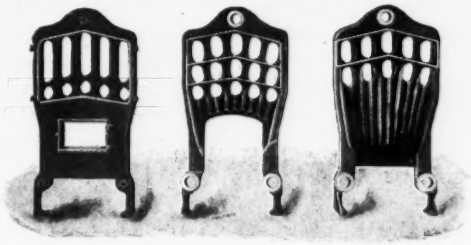

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energy. The heat generated by the combustion of a few pounds of coal in a locomotive, for instance, has an energy sufficient to transport a long train of cars over a distance of many miles.

Latent Heat.

When ice begins to melt it is impossible, until the ice is all melted, to raise its temperature, however much heat may be applied to it. If a quantity of snow or pounded ice at 32 degrees Fahr., or freezing point, is placed in a vessel over a spirit lamp, heat passes rapidly into the ice and melts it, but a thermometer in the mixture of ice and water shows no rise in temperature; the latter remains steadily at 32 degrees until all the ice is melted. What becomes of all the heat thus added to the melting ice, and that produces no sensible effect in heating it?

In order to answer this question satisfactorily it is necessary to measure the quantity of heat that thus disappears when a certain quantity of ice, say a pound, is melted. This may be done by placing separately a pound of water at 32 degrees Fahr. and a pound of ice in similar glass vessels, suspended in a chamber, the temperature of which is carefully kept uniform at, say, 65 degrees Fahr. The water, receiving heat from the surrounding air, will become warmer; and the ice will melt. At the end of half an hour the water may have reached a temperature of, say, 39 degrees Fahr., but not until about $10\frac{3}{4}$ hours have elapsed will the melted ice reach the same temperature.

From the above experiment it is evident that the pound of water received 7 heat units in half an hour, because it was raised from 32 to 39 degrees F. Now, it may be reasonably presumed that in each half hour the ice received the same quantity of heat as the water, because it was under exactly the same conditions with regard to the surrounding air; that is to say, it received 7 heat units every half hour, or 14 heat units in an hour, 140 heat units in 10 hours, and 151 heat units in $10\frac{3}{4}$ hours. Thus, it is discovered that it takes 151 units of heat to change a pound of ice into water at 39 degrees F. Of this quantity of heat only 7 units are accounted for by the thermometer; 144 heat units have disappeared, and are represented simply by the fact that the ice has been melted.

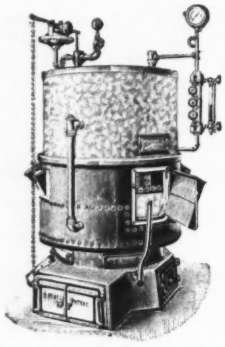
The scientific fact revealed by above results may be confirmed by another experiment called the method of mixtures. If a pound of water at 212 degrees F. is mixed with a pound of water at 32 degrees F., a mixture of two pounds of water at about 122 degrees F. will result. The pound of boiling water, in falling from 212 to 122 degrees F., gives up 90 heat units; and a pound of ice cold water, receiving these 90 units of heat, is raised from 32 to 122 degrees. But if a pound of water at 212 degrees is poured upon a pound of broken ice and stirred until the ice is melted, the thermometer will show the temperature of the mixture to be somewhere about 50 degrees F. The pound of boiling water, in falling from 212 to 50 degrees, gives up 162 units of heat; and the pound of ice receiving the 162 units, is melted, and raised from 32 to 50 degrees. Thus, it appears that of the 162 units given up by the hot water only 18 units are accounted for by the thermometer, and 144 units are missing.

The heat that disappears in this way when ice is melted is called *latent heat.* Having shown that 144 units of heat disappear whenever a pound of ice is melted into water, the question naturally arises, what would happen if the water were converted back into ice? Would the missing heat reappear? By experiment it will be found that the missing heat does reappear. Whenever the space, rather than the total amount of air to be heated. In other words, a furnace rated in the catalogue for 16,000 cubic feet (of space) would be capable of heating just twice that amount of air, or 32,000 cubic feet. The space to be warmed in the building under consideration may be taken as 16,000 cubic feet, and with four changes per hour the total amount of air to be heated would be $16{,}000 \times 4 = 64{,}000$ cubic feet per hour. An average temperature of 70 degrees should be maintained throughout the house when the temperature of the air entering the rooms is, say, 120 degrees in zero weather.

The amount of coal burned per square foot of grate per hour varies considerably under different conditions, but in selecting a furnace to do a given amount of work it is better to figure on too low than on too high a rate of coal consumption. Furnaces are not well managed as a rule, and therefore it is not safe to calculate on burning more than 3 pounds of coal per hour per square foot of grate; nor can the heat absorbing and transmitting efficiency of the furnace be taken as greater than 70 per cent. Even the latter figure is too high for a great many furnaces, not because of essentially bad features of construction, but because of the poor judgment used in the general design and arrangement of the system, as well as the neglect and lack of interest with which the apparatus is commonly handled. However, the efficiency of a furnace, which is by no means entirely dependent on its construction, increases with well-directed attention, and where some one is in attendance more or less all the time, as in school houses, the coal consumption per square foot of grate per hour may be doubled.

Unlike the section cast iron types of steam and hot water heaters, whose heating surface and grate surface may be extended or diminished at will by the addition or removal of the required number of sections, furnaces are placed on the market with a fixed relation between the amount of grate surface and heating surface, their relative proportions being determined by the manufacturers, presumably after experimental testing. Such being the case, a furnace must be selected according to the catalogued size of grate most nearly approaching that which may be found by calculation to be necessary to do a given amount of work.

The four factors already mentioned—viz., (1) the heat losses from the building, (2) the amount of air to be heated, (3) the amount of coal burned per square foot of grate per hour, and (4) the heat-absorbing and transmitting efficiency of the furnace, are the controlling factors which enable the furnace man to approximately determine the



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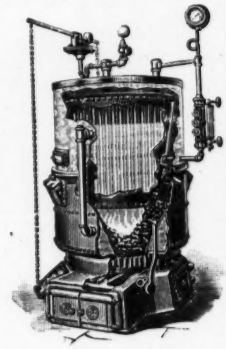

a pound of water at 32 degrees F. is converted into ice, 144 units of heat are developed, and generally given up to the surrounding body.

Here, then, are two fundamental facts that call for explanation: Where does the heat go that disappears when the ice is melted, and where does the heat come from that appears again when the water is frozen?

When heat is applied to a mass of melting ice, a certain amount of energy is imparted to it. This energy goes to pull asunder the molecules of the ice, against the action of the molecular forces that tend to keep them locked in the solid form. In overcoming these forces the heat energy expends itself, and ceases to exist as heat.

This explanation may be vividly illustrated by means of two blocks of lead suspended by separate strings from the same point. Under the influence of gravity each tends to place itself vertically below the point of suspension, and thus they cling together with a certain small force. If they are pulled apart the force that is pulling them together must be overcome and in doing so a certain definite amount of muscular energy must be expended. Now, something of this kind must occur when ice is melted. There are certain molecular forces, the nature of which we do not exactly understand, but the existence of which is certain, that tend to keep the molecules of the ice in that mutual relation in which they constitute a solid body. To melt the ice it is necessary to overcome these molecular forces; heat is the agent by which this is done, and in doing it, heat expends a portion of its energy, just as muscular energy is expended in pulling apart or separating the two blocks of lead. In the one case millions upon millions of molecules are separated through indefinitely small spaces; in the other two massive bodies are separated through a sensible distance; but in both cases a resisting force is overcome, and energy is expended in overcoming it.

Thus it is seen that the heat energy poured into melting ice is expended in melting the ice, and ceases to exist as heat. But, it may be asked, if the heat thus ceases to exist, how is it that the water gives up that heat again when it is converted back into ice? To answer this question reference may again be had to the two blocks of lead suspended from the same point. When they are separated, against the force of gravity, a certain amount of energy is expended, and when they are released they fall together again, and, in falling, acquire an energy of motion, exactly equal in amount to the energy expended in pulling them apart. At the moment of collision, however, this energy of motion ceases, and, like the energy of motion in the falling hammer, is converted into the energy of heat. What takes place between these two masses, as they fall together, may be supposed to take place between the molecules of water, when they fall together in the solid state. In every minute drop of water there are millions of little molecules, held asunder in opposition to certain forces which tend to bring them together into the form of solid crystals. When the water begins to pass back to the solid state, the molecules begin to clash together under the action of these hidden forces; and in the collision, heat is produced just as surely as when the smith's hammer strikes the iron bar. Thus heat is generated, by the collision of molecules, as crystal after crystal is built up, until, when the whole pound of water is converted back into ice, the 144 units of heat that were first expended in the process by which the ice was melted, have been again developed in the process by which the water is frozen.

The phenomenon of latent heat is not confined to water; it is exhibited by other liquids as well, under similar conditions. Whenever a solid is converted into a liquid, heat disappears in the process; and whenever a liquid is

size of grate required in a properly arranged furnace in any kind of building, the relative importance of each factor being made apparent when each is reduced to a "heat-unit basis."

To illustrate this process of "reduction" the first step will be to determine the amount of heat lost through walls and windows. This loss is commonly expressed in British thermal units, usually abbreviated B. T. U., a heat unit being the amount of heat required to raise the temperature of one pound of water one degree Fahrenheit. By experiment it has been found that heat is transmitted through ordinary glass windows at a rate varying between 0.78 and 1.8 B. T. U. per square foot of surface per hour per degree difference of temperature, the amount of heat thus lost depending on exposure and effect of winds, as well as on the relation between inside and outside temperatures.

Having reduced the wall surface to its equivalent in glass surface, and assuming that the first-named rate of heat loss will meet local conditions, the total loss of heat through the walls and windows of the dwelling under consideration is found by multiplying 987, the total amount of glass surface, by 0.78, and the product thus obtained by 70, the difference between the outside and inside temperatures, thus—

$$897 \times 0.78 \times 70 = 53{,}890 \text{ B. T. U.}$$

It has also been found by experiment that in warming air one heat unit is sufficient to raise the temperature of about 55 cubic feet of air one degree Fahr. Hence, by dividing the total amount of air to be heated by 55, the number of heat units required to raise the temperature of that air one degree will be found. The total heat required to warm the air is then found by multiplying the quotient thus obtained by the number of degrees the air is heated, which, in the example herein given, is 120 degrees, neglecting loss of heat in leaders and stacks. The whole operation may be expressed thus:

$$64{,}000 \div 55 \times 120 = 139{,}632 \text{ B. T. U.}$$

Ordinarily good coal completely burned will give off about 13,500 B. T. U. per pound, and with a combustion rate of 3 pounds of coal per square foot of grate per hour the amount of heat generated, theoretically speaking, would be $13{,}000 \times 3 = 39{,}000$ B. T. U. per square foot of grate surface per hour, but, as previously remarked, the efficiency of the majority of furnaces does not exceed 70 per cent, so that the amount of heat usefully employed would be $70 \times 39{,}000 = 27{,}300$ B. T. U. per square foot of grate surface per hour, with a coal consumption of 3 pounds per square foot of grate.

Adding the amount of heat lost through walls and windows to that required for warming the total amount of air necessary to keep the building comfortable, and then

converted into a solid, heat is developed in the process. The amount of heat required to melt a pound of any solid, already existing at its melting temperature, is called the latent heat of that liquid. It is remarkable how widely the latent heat of different liquids varies. We have seen that it takes about 144 units of heat to melt a pound of ice without raising its temperature; and hence the latent heat of water may be roughly set down at this figure. More exactly speaking the latent heat of water is 142.6. No other substance requires so much heat to melt it as ice does. If nitrate of soda, for example, has been already heated to its melting point, only 113 units of heat are required to melt a pound of it; nitrate of potash requires only 85 units; silver, 37.9; lead, 9.86; and mercury a trifle more than 5 units.

Freezing Mixtures.

A solid may be changed into a liquid not only by melting it, but also by dissolving it; as salt, for instance, is dissolved in water, or sugar is dissolved in tea. Since the particles of the solid body must be torn asunder against resisting forces, in the one case as in the other, we should naturally expect that heat must be expended when a solid is dissolved no less than when a solid is melted. That this is so, in reality, may be readily shown by experiment. Into a vessel nearly full of water, at a temperature of, say, 54 degrees, put about half a pound of sal ammoniac at the same temperature. Now plunge the bulb of a large air thermometer into the water and stir the water. As the sal ammoniac begins to dissolve the colored liquid falls rapidly in the stem of the air thermometer. This result is due to the fact that heat must be expended to dissolve the solid body; and, as that heat is not furnished from without, it comes from the mixture itself, which is quickly chilled in consequence. With an ordinary mercurial thermometer, the temperature of the solution will be found to have fallen about 7 degrees below the freezing point.

This is the principle on which freezing mixtures are made. Two or more substances are mixed together, one of which, at least, is a solid, and is dissolved in the mixture. The heat that must be expended in dissolving the solid comes, in great part, from the mixture itself; and by the loss of this heat the mixture may in some cases be reduced to a temperature many degrees below the freezing point. By dissolving, say 600 grammes 7 sulphate of soda, and 500 grammes of nitrate of ammonia, both solids, in 400 grammes of dilute nitric acid, all at a temperature of 54 degrees, the temperature of the mixture will fall 27 degrees below the freezing point.

If one of the substances employed in the freezing mixture is already at freezing point, the cold produced may become still more intense. One of the best freezing mixtures known is composed of snow and common salt, in the proportion of two parts, by weight, of snow, to one of salt. In this case both the substances employed are solid, both are dissolved in the mixture, and one of them already exists at freezing temperature. In default of snow, pounded ice may be used as a substitute. Introducing a thermometer into such a mixture will at once indicate a temperature of 4 degrees below zero.

Heat of Solidification.

Freezing mixtures furnish a striking proof that heat is expended when a solid is converted into a liquid; and, conversely, that heat is developed when a liquid is changed into a solid. An extremely interesting experimental proof of the truth of this statement may be obtained by means of a little apparatus in which the bulb and part of the stem of an ordinary thermometer are surrounded by a small glass vessel, partly filled with water, the glass vessel being exhausted of its air, and hermetically sealed. Water, under these conditions, if kept in perfect repose, may be reduced to a temperature several degrees below the freezing point, and still continue to exist in the liquid state. The molecules seem to be under some constraint that prevents them from obeying the molecular forces that act upon them, and from building up solid crystals of ice. But a very slight disturbance is sufficient to release them from this constraint; the building up of the ice crystals then sets in with astonishing rapidity; and, in a moment or two, a great part of the liquid passes into the solid state. In itself this fact is striking enough, but it is even more wonderful that, at the moment the water is converted into ice, it becomes sensibly warmer than it was before. The temperature of the water may fall 14 degrees below the freezing point, the water still remaining liquid. By shaking the vessel a portion of the water instantly passes into ice, and the thermometer rises rapidly from 18 to 32 degrees Fahr.

Evidence that heat is produced when a liquid is solidified may be obtained by nearly filling a glass beaker with a clear transparent liquid obtained by dissolving a solid body, commonly called sulphate of soda, in water. It is found that hot water will dissolve a great deal more of this solid than cold water. But if the solid be first dissolved in hot water, until the water can dissolve no more of it, and the solution be then allowed slowly to cool, being

dividing the product by the usefully employed heat obtained per square foot of grate by the combustion of 3 pounds of coal per hour will give the required size of grate for a furnace capable of keeping the entire house at a temperature of 70 degrees in zero weather; thus:

$$53{,}890+139{,}632\div 27{,}300=7.1 \text{ square feet, nearly.}$$

From the above calculation it is evident that a grate having 7.1 square feet of surface would be required, and the corresponding diameter of the grate would be 36 inches. The result thus obtained may be compared directly with the catalogued manufacturers' ratings when it is borne in mind that a furnace rated by the manufacturer to heat 32,000 cubic feet of space will warm twice as much air, or 64,000 cubic feet per hour, and take care of all ordinary heat losses. Reference to such catalogues shows that for the above-named amount of heating different makers provide grates varying from 29 to 35 inches in diameter.—C. W. Wadsworth, in *The American Artisan.*

Agreements and Arbitration.

ARE THEY OF VALUE?

By E. M. Craig.

Two recent utterances by two men prominent in labor circles have caused both employers and employes to begin to wonder if arbitration and agreements are good things for either side of the labor problem. One of the two men mentioned, a prominent official of the Chicago Federation of Labor, claims that agreements between employers' associations and labor unions invariably result in the union getting the worst end of the bargain, and that through this medium the employers seek to tie the hands of organized labor, and prevent one organization from assisting the other by prohibiting sympathetic strikes. The other prominent official, a secretary of an employers' association, declares that a large number of employers believe arbitration is a failure, because the employer invariably gets the worst of it, and that the labor unions will not abide by the decision of the arbitration committee when the decision is given against them. The remarks of these two gentlemen were prompted, in the first instance, by the activity of the employers in compelling the unions to live up to their agreements, and their recent use of the courts to determine through law the rights of employers; in the second instance, the remark was prompted by the notification of the withdrawal of the labor delegates from the Chicago Board of Arbitration.

What a merry old time there would be in this city if we returned to the period of no agreements again. It would mean constant strife and turmoil, no contracts for the employer, and no work for the employe. What good are agreements, they ask. None at all, if they are not lived up to, but they are as good and great a compact as was ever drawn up, if they are respected by both parties. They maintain peace and harmony in the ranks of labor, they give the employer and employe all the protection they may need, they assure every employer that his competitor has to work his men the same number of hours that he does, and that he has to pay his men the same rate of wages —two very important items in making figures for doing any kind of work. The agreement further guarantees to the employer that he will receive the same class of skilled labor as his competitor, that for a certain period the wages shall be so much and no higher, that he can guarantee the customer that the work will be completed, uninterrupted by labor troubles. An agreement gives stability to trade; it invites

carefully protected in the meantime from dust and disturbance, it will still remain in the liquid state when cold. An air thermometer should be placed in the liquid when first prepared, and the surface of the solution covered over with a layer of oil to shut out the impurities of the atmosphere.

After the solution has been permitted to cool quietly it would seem to be in a condition analogous to that of the water in the liquid state at a temperature of 14 degrees below freezing point. The molecules of sulphate of soda are eagerly solicited by certain hidden forces to come together into the form of solid crystals. But they seem to be under some constraint that makes it difficult for the process to begin. They may be relieved from this constraint by dropping into the liquid a small crystal of the same substance, attached to a copper wire. The copper wire should be attached to the middle of a cross-piece, so that, when the crystal is dropped into the liquid, the cross-piece rests on the upper edge of the beaker; and keeps the crystal suspended in the middle of the liquid. The building up process then sets in; the molecules of sulphate of soda rush together in myriads, and the solid crystalline mass can be seen growing outwards, in all directions, with a rapidity that is certainly most wonderful. In the meantime, the colored liquid rises in the stem of the air thermometer, revealing the fact that heat is generated as the sulphate of soda passes from the liquid to the solid state. In less than a minute the clear transparent solution becomes almost a solid mass; the colored liquid rises about 4 inches in the stem of the air thermometer; and a mercurial thermometer indicates that the temperature of the contents of the beaker has been raised from 54 to 68 degrees F.

Latent Heat in the Economy of Nature.

As a final illustration of the nature and characteristics of latent heat, consideration will be given to some of those natural phenomena that anyone can observe and study for himself. Everyone must have observed how long it takes, when a frost sets in, before a thick sheet of ice is formed on the surface of a lake. When the first crystal of ice appears, the surface has already been reduced to the freezing point; and yet days often pass by, even during an unbroken frost before the ice is an inch thick. It will be apparent that if it was only a question of temperature, the transition of a mass of water at the freezing point into ice would be almost instantaneous. But for each pound of ice-cold water that passes into ice, 144 units of heat are given up, and must be carried off by the atmosphere; and this is plainly the reason why the process of freezing goes on so slowly. The quantity of heat, in fact, that must be taken away from water at the freezing point, in order to convert it into ice, would be sufficient, if it were added instead of being taken away, to raise the mass of water to within 36 degrees of the boiling point. Putting this statement into figures, with a lake about 6 acres in extent, supposing the whole surface to a depth of one inch to have been already reduced to freezing point, it would be found, from the data given above, that before it could be converted into ice, the layer of water must give up as much heat as would be sufficient to boil somewhat more than 300 tons of ice cold water.

Again, after a severe winter, great patches of snow may sometimes be seen hanging for a long time on the mountain slopes, holding their ground with wonderful pertinacity, as it would seem, against the increasing warmth of spring. And the great snow fields of the Alps are able to bid defiance, the whole summer through, to the consuming heat of a southern sun. The reason of this is made clear, because for every pound of snow that is melted approximately 144 units of heat must be poured into the mass. Whether in the end the balance will be in favor of the sun is simply a question of calculation. The quantity of heat imparted to that snow, during the summer, may be measured in heat units. And if there be not 144 such units of heat for every pound of snow that has fallen, then a balance of last season's snow will be carried over to the coming winter.

From these considerations it is evident that the latent heat of water has a very important influence in the economy of nature. It prevents those sudden changes which would be always inconvenient, and often destructive. If it were not for the latent heat of water, on the first approach of winter, when the temperature falls below frezing point, the rivers would be at once converted into massive blocks of ice, and would cease to flow in their channels. And when, with the changing seasons, the returning summer, breathed again on the slopes and summits of the higher mountains, the snow fields would be melted in a day, and, sweeping down with impetuous force, would flood the plains and carry destruction in their course. But, through the influence of latent heat, the rivers are slowly frozen when winter comes, and the ice and snow are slowly melted when winter passes away; thus affording evidence of the beneficient design that everywhere pervades the order of nature, and guides all things for the use and convenience of man.

the confidence of the public; it inspires the public to purchase. It gives to the employe the assurance that his labor is worthy of its hire. It adds manliness to his position and dignity to his character. It insures him more work and more wages, sunshine and happiness., prosperity and plenty, and all because his organization has made with their employers an equitable agreement to dwell in peace and harmony. Without agreements every industry in the country would be in turmoil, and particularly in the city of Chicago. While peace does not seem to agree with some leaders, and many of them seem to thrive best when the labor market is in a turmoil, ninety-nine per cent of the Chicago contractors fully believe in agreements, and the same percentage equally believes that in the renewal of the trade agreements last spring there was no advantage taken of the employes, but that on the contrary the employes received a great many concessions which the conditions in the labor market did not warrant.

Is arbitration a failure? If it is in one or two cases, must it necessarily be so in all? There is no doubt but that many cases of arbitration are a failure, and that one or the other of the parties sometimes get the worst of it, but where a Board is properly constituted and organized and has something to back it up, you will invariably find that arbitration is a success. No arbitration board should be constituted without direct representation from the parties interested, and no man should be selected for umpire who has not some direct knowledge of the interests he is legislating for, and no person should be selected as an umpire who has any political or social axes to grind.

The Building Contractors' Council is a central organization composed of some fourteen separate organizations, each one of which has working agreements with its employes' association. Each association makes its own agreement without any interference from the central organization, and each provides for a system of arbitration, a Board composed of five men from each side. This Board arbitrates and adjusts any difference that may arise in their respective trade. And the central organization does not in any manner interfere, or attempt to even advise them. The plumber, the carpenter, the mason, as all other trades, take care of and adjust their own difficulties.

The fourteen associations comprising the Building Contractors' Council believe in working agreements and also in arbitration. Each and every one of them has had a trial of arbitration for the past three years and has found it a very effective and satisfactory way of settling disputes and grievances. No single instance in the past three years of all these agreements can be cited as a failure of an arbitration committee to adjust a dispute in the building trades. There has been little or no trouble in the building line except a few trade jurisdictional disputes, recent assertions, that two-thirds of the labor troubles during the past year were caused by the building trades notwithstanding. No unions or employers' associations have repudiated their agreements, in the building line, except one recently in the marble line, which is a small trade; and as there is something back of their agreement on the employers' side, and something behind them again, there is no doubt that the employes will soon see the error of their ways and get into line again.

The Delphos Foundry & Machine Co. has been organized at Delphos, O., to manufacture patented machinery for boiler and radiator plants. The company will also manufacture a hot start cupola for the utilization of stove scrap.

Thus far latent heat has been considered only in relation to liquids, leaving its relation to vapors, a branch of the subject not less interesting and one that affords, perhaps, a larger scope for experimental illustration, to be taken up later.

(To be Continued.)

APPORTIONING RADIATION IN CENTRAL HOT WATER HEATING PLANTS.

BY W. E. MELLINGER.

THE greatest advancement in the evolution of the heating trade during the past ten years is without doubt the system of heating buildings from a central station. Since 1898 no less than sixty-two such plants have been constructed in the middle west, and heating contractors have been called upon to equip the houses for this system without any special rules for the installation, aside from the specious talk of the promoters that much less radiation was needed than in a gravity job, and the equipment would not cost much more than a hot air furnace. I have before me now the prospectus of a new plant in Ohio in which they state that an ordinary 8-room house can be equipped for $150 or $175!

Having been actively engaged in this special branch of the business for a number of years, sometimes equipping a hundred houses in one season in a town, I have been asked by DOMESTIC ENGINEERING to give the result of my experience on the subject at the head of this article. I will confine myself to hot water plants, as there are more of that system used than steam.

Central heating systems have been in operation, to a small extent, for the past forty years, but it is only within the past ten years that they have begun to be adopted so widely. The Evans-Almiral Co., of New York, and H. T. Yaryan, of Toledo, are the pioneers of this later period, and the Yaryan system and its improvements are now being promoted very actively. Of the various adaptations of Mr. Yaryan's original ideas, Schott's balanced column system comes the nearest to my idea of perfection of any system now before investors.

The first and practically the only question the heating contractor need determine in apportioning radiation in a house heated from a central station, is the temperature of the water delivered at the house and at what pressure.

Taking the secondary consideration first, the pressure should be great enough to force the water through the highest radiator in the house; the greater the pressure above this point, the faster the water will travel and the more heat units it will give out through the radiators.

As to the temperature, there is the greatest divergence in actual practice in different plants. I have seen the water returning at Indianapolis, after a circuit of a mile and a half, at 190 degrees when the outside temperature was 10 degrees below zero. I have also seen the water enter a house in another plant near Chicago at 159 degrees when it was 13 degrees below zero! It is needless to state that if the radiation was apportioned to heat the house properly at the Indianapolis plant, the people would have frozen in the other house with the same radiation. And yet I have met learned professors who have taught engineering for thirty years who contend that the same rule should be used in all cases, and that if a house afterwards prove cold the only thing to do is to add radiation, to make up for the low temperature of water.

And here is the secret of the trouble wherever a central heating plant has proved unsatisfactory. When the project was first promoted, the cost of the equipping was cut down to the lowest possible figure, in order to influence house owners to prepare their buildings for heat; the cost of the enterprise rising above the contemplated amount, economy in operation was sought by lowering the temperature of the water. The houses were inadequately heated, with the result that more radiation was needed. This being conceded and more expense gone to by the consumer, then the price for heating was raised per square foot of radiation and the income of the company thereby greatly increased!

The schedule of temperatures at which the water leaves the central station varies greatly. Some plants start at a basis of 140 degrees at freezing and raise or lower one degree for each degree of variation in outside temperature. This is the lowest schedule I know of in practice, and if there is much loss in transmission the radiation must be figured very strong. The most satisfactory plants follow a schedule based on 160 degree at freezing. I append a letter which explains itself:

PROTECTIVE COATING FOR IRON.

Iron to be painted should be absolutely free from rust. It depends of course upon the shape of the piece whether the removal of the rust present should be carried out mechanically by rubbing with pumice-stone, pieces of coke, wire brush, etc., or by the use of corrosives. If in any way possible the last named course should be avoided; but if the shape of the piece admits of no other cleansing method, great care should be taken that the subsequent alkaline bath is, and remains sufficiently strong, and that the drying after the water bath is conducted at as high a temperature as possible, and be perfect.

None but absolutely dry iron should be painted, and this principle should be adhered to in the subsequent coating as well.

For the initial coating of iron, hot linseed oil varnish should be employed, and the application be made very carefully so that all the places are covered with it. This coat of varnish, which constitutes a sufficient protection against rust, is succeeded before the joining (places which cover each other should be painted well before joining, also bore-holes, rivet heads and rivet pins) by a priming coat with a pure red lead in good linseed oil varnish.

Only ground oil paint should be used with suitable brushes. Mixing the pigments with the linseed oil varnish, on the spot, without grinding, is inadmissible, and the painting should be performed by skilled painters and not inexperienced workmen.

After the priming, three coats of paint should be put on in intervals of at least one week, but it is absolutely necessary to see that the preceding coat is perfectly dry before putting on the next.

The puttying up of crack holes, irregularities, etc., is done (after the priming with red lead) with a putty consisting of red lead and linseed oil varnish, and no paint should be put on the putty until it has hardened.

The paint used must flow well from the brush and must have good covering power. It should not contain oil or turpentine, benzine or other hydrocarbons for diluents, nor liquid driers, and must have dried sufficiently within twelve hours so as to be no longer acted upon by rain.

The paint proper must answer the following requirements as regards ingredients:

(1) An indifferent—as far as possible—pigment requiring much linseed oil varnish to produce the suitable working consistency.

(2) Pure linseed oil varnish of good quality without foreign admixture.

IS EDUCATION NECESSARY?

This question as applied to a steamfitter might be answered by saying that education is not so necessary that a steamfitter can not work at his trade without it, but if a steamfitter wishes to obtain a thorough knowledge of his trade he must and should endeavor to learn as much as possible of those matters which have a direct bearing on his work. A workman in any trade or calling who possesses a knowledge of the technical points of his trade in connection with the practical knowledge obtained through his use of the tools has many advantages over a workman who is not so fortified.

A steamfitter or helper who knows the relative area of pipes of different sizes as well as the relative capacity of pipes of different sizes and lengths is a more valuable workman to his employer than one who does not possess such knowledge.

It is well that the men of our craft should know as much as possible of the mechanism and construction of the different appliances used in installing our work, and particular attention should be paid to the use and objects of such appliances. Every possible opportunity should be used by the men of our craft to elevate their condition mentally as well as industrially and financially, and in

CHICAGO, October 5, 1903.

MR. W. E. MELLINGER, 142 Michigan Street, City.

Dear Sir: Replying to your favor of the 3d inst., would say that the temperature scale which I advise to be followed by operators of "Schott's Balanced Column System" of hot water heating is as follows:

Outside	Temperature,	60	degrees; Water	Temperature,	120 degrees.
"	"	50	" "	"	140
"	"	40	" "	"	150
"	"	30	" "	"	160
"	"	20	" "	"	180
"	"	10	" "	"	190
"	"	Zero	" "	"	200
"	"	10 below zero	"	"	210
"	"	20	" "	"	220
"	"	30	" "	"	230

I find that this scale of temperature proves to be very satisfactory. In some instances, in cases of high wind, it is advisable to carry a little higher temperature in the water, but in cases of ordinary weather, the above temperatures should take care of the radiation perfectly, allowing a range of from 75 to 80 degrees to the consumer, provided the radiation has been properly figured and connected.

The above temperatures are such as are shown at the station, being adequate to take care of any building within a range of three-quarters of a mile from the plant, as I find from various tests that I do not lose to exceed three degrees at a point a mile from the central station plant.

Trusting this will answer your questions, I am, yours truly,

W. H. SCHOTT.

I have before me a contract for hot water heating used by a plant in Illinois, which contains this clause:

"The water supplied shall enter the building at not less than 130 degrees when the outside temperature is at freezing and to be raised one degree for each drop of one degree outside."

Comparing these temperatures to gravity hot water practice, it will be remembered that the "Carbon Club" catalogues now include this statement:

"The following ratings are for direct radiation and are based upon all piping being figured as radiation, and * * * a temperature of 150 degrees in the water as it leaves the boiler. Therefore, radiation to heat the building should be figured on the same basis, or due allowance made for other temperatures and pressure, as well as for loss of heat in the mains."

Upon consultation with one of the most prominent boiler manufacturers, he stated that this guarantee really meant at zero, and that he would not guarantee the rating at 20 degrees below zero.

With the initial temperature in the house at 180 degrees at zero in a gravity plant, 172 degrees at zero in a pressure system (the lowest schedule mentioned above) would be more than ample; but in this climate 20 degrees below zero is occasionally reached, therefore the advisability of carrying a schedule similar to that of the Schott system.

Hence, in general terms, if a heating contractor is called upon to equip a house for a central station system, if the temperature schedule is low he must not use less than he would for gravity: if a high schedule be used, he can reduce it proportionally. I figure that if, say 1,000 feet of radiation will adequately heat a house at zero with initial temperature of 180 degrees, it will require 15 per cent more radiation at —10 degrees, and 30 per cent more at —20 degrees; also, starting from the same basis, if the temperature is increased to 190 degrees it will require 10 per cent less radiation, and at 200 degrees it will require 20 per cent less.

As to the formula to be used in computing radiation for central plant work there are as many as there are heating engineers. The one I have found most satisfactory, based on 140 degrees at freezing and 172 degrees at zero, is as follows:

1 sq. ft. glass=1 sq. ft. radiation.

10 sq. ft. exposed wall=1 sq. ft. radiation.

200 cu. ft. contents=1 sq. ft. radiation.

As in figuring gravity work, so in central heating plants, poor construction of buildings, loose windows, etc., must be taken into consideration. It must also be remembered that with high winds at zero, as much heat is required as at 20 below zero with no wind.

No contractor should give a guarantee as to the efficiency of his equipment without stating the temperature of the water as it enters the house; as if on account of imperfect insulation in the streets, or for the sake of economy, the plant furnishes a low temperature of water, the house will be cold.

All of the above remarks are of course based on the supposition that the piping is properly installed for the use of a pressure system, which subject may form the basis of a future article.

this connection it is well to note that the most intelligent workman is never the lowest paid.

No matter how humble our station in life may be, we can improve our condition if we only try and keep on trying until we succeed, and we can also create our own opportunities if we so desire.

The cardinal principles of this association as exemplified in our seal are CO-OPERATION, EDUCATION and PROTECTION, and it must be evident to all that an organization whose membership is bent on obtaining a *"knowledge"* of their trade are better equipped to *"co-operate"* with each other in *"protecting"* the interests of their association than an organization that is not so constituted.

It is to be hoped, therefore, that all steamfitters and helpers will never imagine they know it all, as such an assumption is a heavier handicap than ignorance, and always bear in mind

That in Life's earnest battle they only prevail

Who ever march onward and never say fail.

—*The Steam Fitter.*

WORLD'S DEMAND FOR TOOL-MAKING MACHINES.

The *Deutsche Industrie Zeitung*, in a recent issue, calls attention to a congress or makers. Reports of those present went to convention of Germany's tool-machinery show an increase of business in the Empire; but the orders were not large enough nor the prices satisfactory. The orders from the government were not nearly as large as desired. Complaint was made against the custom of the large iron mills of contracting for machinery only on condition that part payment be made in the iron or steel products of the mills. Another evil complained of is the custom of the iron or steel mills of making their own conditions when contracting, instead of following, as formerly, well-established customs. In the matter of contracts in which it is provided that the tool makers take steel or iron from the mill, great abuses have crept in. The contract provides sometimes that fully 50 per cent of the bill be paid in material. Inasmuch as the greater part of a tool-making machine's value lies in the labor expended on it and the most of the material is cast iron, the demand of the mill to be allowed to pay for it in its products seems unfair and unjust. It is thought that little can be done in individual or isolated cases, but that a combination of the machine builders might effect a reform. Reports made to the convention regarding foreign trade show a decline. In France everything was quiet, Italy offers little encouragement, Spain promises great things by and by, particularly for the marine. The United States, it was said, must be given up as hopeless because of its own developments of machine making.

HAVE ISSUED A NEW CATALOGUE.

The United States Radiator Company, of Dunkirk, N. Y., have issued a new catalogue which for the first time presents several of their new products, which include a three-column plain Triton, a new wall radiator, a new five-column window Triton, a new box base for direct-indirect heating, a wall box for direct-indirect radiators, a 20-foot pin indirect, and some wall pedestals. This catalogue will be mailed upon request.

VISITED BY FIRE ONCE MORE.

The Novelty Iron Company, of Canton, Ohio, was again visited by fire on Thursday night, October 1, but as it did not reach their producing or manufacturing end, business is going on uninterrupted. The fire did damage to the amount of $40,000.

Incandescent Gas Lighting.

At the meeting of the Gas Institution in June, 1901, Mr. Sugg gave a paper on "High and Low-Pressure Gas Incandescent Lighting." The paper was illustrated by drawings of the burners and of the pressure-increasing apparatus as it then was. Since that time considerable improvements have been made in this system of lighting and in the paper read before the Institution of Gas Engineers, in June, 1903, William Sugg briefly describes these improvements, says *Progressive Age*. Since the meeting in 1901, the Tower Bridge, Blackfriars Bridge and London Bridge have been lighted by incandescent gas—the two former with high-pressure and the latter with low-pressure; also Bristol Joint Station of the Great Western and Midland Railways, York Station of the Northeastern Railway, and a number of other railway stations, engineering factories, lace factories, etc., with high-pressure—the author's improved water engine being used. Now, these installations have necessitated a special arrangement both of burners, reflectors and pressure-increasing apparatus to satisfy the different requirements. For example, in engineering factories the vibration of the machinery was found very destructive to mantles, and in consequence it became necessary to provide a means by which this excessive vibration might be counteracted. This has been effectually done by the suspension light.

For many shops and mills where there was a nearly regular running shafting, some of the pressure-increasers were arranged to be driven from the shafting; and a by-pass arrangement was devised so that when any of the lights were put out, the pressure was not increased, or when the number of the lights was increased according to the requirements the pressure was not reduced. This is found to be a very economical way of raising the pressure, the only drawback to it being that if the machinery stopped the light stopped also. In order to obviate this objection the writer devised a new engine consisting of two oscillating horizontal cylinders placed at an angle of 120 degrees, which would automatically supply all the burners in the factory with the proper quantity of high-pressure gas required at any moment, and by which the inconvenience of the valves which were used in the first-mentioned engines sometimes sticking and clattering is done away. The engine regulates its speed by means of a simple form of throttling governor consisting of a lever attached to a diaphragm under gas supply pressure and the other to two conical valves on one-stem which throttle the steam supply so that it can supply from one light to its full number of 300 or more 10-feet burners automatically. When all the lights are turned off it stops. The engine and the pump are both fixed upon one base-plate; the two steam cylinders, working without valve-slides or connecting rods, driving one crank common to the three cylinders. The crank is provided with a fly-wheel, so that the revolutions of the engine are kept perfectly steady. The valves, both of the engine and of the gas cylinders, are face valves provided with a center-pin on which the cylinders move; and by means of the oscillation of the cylinder caused by the motion of the crank, the valves are opened and closed. Consequently, they work with the smallest amount of friction. The pressure of both gas and steam tends to lift the cylinders, and thus reduce the friction on the valve surfaces. The action of the pressure-increaser is silent. At the same time, the valves, being under the cylinder, let out any condensed water from the steam which accumulates when the engines are working slowly or stop. The engine therefore starts itself whenever one or more lights are turned on, supplying the quantity of gas required without any attention. The requirements of some engineering shops and lace mills are such that it is not convenient to work off the boilers which drive the machinery of the mill; and so it has been found necessary to provide a separate engine, so that the lights are kept burning though the engine of the mill or workshop is stopped. This has been done by means of the engine just described. But for some of these places it is better to use a gas engine; and this has been done by a combination of gas engine with a pressure-increaser designed by the writer consisting of gas engine, chain-sprocket gear, gas compressor, anti-pulsation tank, pressure regulating governor and pipe system in series.

In the cases of the Tower Bridge anl the Bristol Joint Station of the Great Western Railway, the water engines were found very convenient, because they started and stopped themselves without attention, as does also the steam engine, regulating the quantity of gas to the exact amount required. These were replaced by gas engines because the pressure of the water was sometimes too much reduced by the turning on of a hose for washing down the roadway. The same kind of apparatus fixed at Portsmouth Dockyard was also affected by the filling of boat tanks and the washing down of the roadways. The same thing happens sometimes for a few moments by the filling of the engine tanks at a railway station; but the main difficulty, which could not be overcome, was that the water companies, without notice, were in the habit, occasionally, of shutting off the water altogether; then the station was put nearly in darkness, the burners having to burn on a pressure of not more than 1.25 inches of water. The water in the case of the Bristol Joint Station and other stations was charged at the high rate of 25 cents per 1,000 gallons; and this very seriously affected the cost of lighting. But as soon as the gas engines were adopted, the cost of raising the pressure up to 12 or 14 inches was immediately reduced to rather less than 1 cent per 1,000 cubic feet. It is found that a very small gas engine of 1 horse-power, is able to keep from 100 to 120 300-candle-power burners going continuously.

There were two water engines used in the lighting of the Bristol station—one for one side of the line and the other for the other side. These are now replaced by two gas engines of about 1 horse-power each. The mains are connected, so that in case of any repairing or cleaning having to be done to the one engine, the other one is capable of lighting the whole station. Therefore, by means of either the steam or the gas engine pressure-increaser, there is no danger of the system failing as there would be with the water motors when the water companies suddenly shut off the supply. Of course, the burners which are used for the high-pressure lighting will also work on the low pressure; so that at midnight, for example, in places where they do not want so good a light, or on railway platforms when there is no train in, the pressure-increaser can be stopped, and the lights will burn on low pressure, giving about one-third of the light that they were giving on high pressure.

The pressure of the gas used on the Tower Bridge and Southwark Bridge is 10 inches, giving 10 cubic feet of 14-candle gas per burner. At Blackfriars Bridge, which is supplied by the Gas Light and Coke Company, the gas is 16-candle-power under the same pressure, with the same consumption of 10 cubic feet an hour for each burner. But by raising the pressure to 14 inches which scarcely affects the cost of working the gas or steam engine, the illuminating power of each burner may be increased to 400 candles instead of 300 candles, with an extra consumption of 2.5 to 3 cubic feet per hour per burner (according to the quality of the gas); and this quality adds about 100 candles to the volume of light—thus making an addition in illuminating power of 40 candles to the cubic foot, produced by this small extra quantity. In some cases where pipes are old and may not stand the pressure of 10 to 14 inches, the illuminating power may be produced by putting the air under pressure instead of gas, and leaving the gas to enter at the foot of the burner at the normal pressure supplied by the gas companies.

For this purpose the author has devised a new burner. It will be perceived that the gas comes into the burner by a central jet, taking in a certain quantity of air with it in the usual way with Bunsen burners. Around this is an annulus of a number of fine holes exactly the same as those in the old Argand burner, through which the air under a pressure of from 10 to 14 inches, or even more if required, is delivered into the supply tube by regularly spaced jets, and goes up round the columns of gas and air brought in by the jet, until it gets to the top of the burner. With richer gases, this burner produces a much better result because a larger quantity of air, and, consequently, more oxygen, can be mixed with the gas; and this is sufficient to produce as perfect a combustion as it does with the lower qualities of gas, with a proportionate gain of illuminating power.

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NOW WITH THE JOHN SIMMONS COMPANY.

Walker Kerr, formerly salesman with E. S. Wheeler & Co., has joined the forces of the John Simmons Company, and will now represent them in the plumbing supply trade.

GOES TO KENNEY MANUFACTURING COMPANY.

George Robinson, with the Colwell Lead Company, has recently resigned to accept a position with the Kenney Manufacturing Company, of 36 East Twenty-second street.

IN EUROPE ON BUSINESS.

Daniel W. Dinneen, of the firm of Cook & Dinneen, 217 West 125th street, New York City, left the city for a business trip abroad on September 23. He expects to be gone two months. He is now in London, England.

BUSINESS GETTING BETTER.

John C. Wickes, of Beekman street, New York, says that business is improving and prospects for fall trade are growing brighter. He thinks that confidence is being restored in the building line in the territory where the labor troubles for the past months have caused so much trouble.

CITY CUTS DOWN PLUMBER'S BILL.

A reduction in a plumber's bill was made in the Finance Department of New York City when Nicholas Nehrbauer, Jr., of 683 Steinway avenue, Long Island City, was allowed only $433.60 instead of $806.18. The work was in the Borough Hall building in Queens. The plumber accepted the reduction.

STEAMFITTERS' STRIKE BROUGHT TO END.

At a conference held Friday, October 2, between the committees representing the steamfitters, who have been on strike since early in August, and the Master Steam and Hot Water Fitters' Association an agreement was reached terminating the strike. The men get the advance from $4 to $5 a day. They agreed to sign the employers' arbitration agreement.

WILL HOLD TENTH ANNIVERSARY MEETING.

The tenth anniversary meeting of the American Society of Heating and Ventilating Engineers will be held at 12 W. Thirty-first street, New York, January 19, 20 and 21, 1904, says W. M. Mackay, secretary of the society. A special programme is being prepared by the Board of Governors and the Anniversary Committee. This meeting promises to be the most largely attended and successful meeting the society has ever held.

TO MAKE PLUMBERS' SUPPLIES.

The New York Central Manufacturing Company, of Utica, N. Y., has been incorporated and the concern will be located in the Geary building at 44, 46, 48 and 50 John street, in that city. Dr. D. H. Roberts is president, James H. Parker is vice president and R. T. Parker is secretary and treasurer of the company. The board of directors is composed of George J. Hollingworth, R. T. Proctor, of Utica, and John Carruthers, of Trenton.

ATTACHMENT AGAINST BELL COMPANY.

Deputy Sheriff Snedden has received an attachment for $3,781 against the Bell Pure Air & Cooling Company, of 135 Broadway, New York, in favor of Louis Bell for services as consulting engineer, which was granted on the ground that it is a foreign corporation. The business was originally incorporated in March, 1898, with a capital stock of $500,000, under New Jersey laws, as the Bell House Cooling Company, and was reorganized in June, 1900, under the present style. The sheriff served the attachment on a trust company.

INCORPORATION OF A NEW COMPANY.

Mitchell & Van Meter Company, 247 Centre street, New York, is a new incorporation, of which the incorporators were R. H. Mitchell, J. W. Van Meter and Geo. H. B. Martin. The officers are: R. H. Mitchell, president, and J. W. Van Meter, secretary and treasurer. Both Mr. Mitchell and Mr. Van Meter were connected in official capacities with Salem Brass & Iron Mfg. Co., Salem, N. J., but left there to form the new concern. Prior to their connection in Salem Mr. Mitchell was a member of the firm of Irwin & Mitchell, of Philadelphia, and Mr. Van Meter was a member of the firm of J. W. Van Meter & Co., of Philadelphia.

BROOKLYN PLUMBING REGULATIONS AMENDED.

Sections 39 and 106 of the plumbing rules and regulations of the Borough of Brooklyn were amended recently to read as follows:

Sec. 39. "All connections between lead pipes and between brass or copper pipes must be made by means of wiped solder joints, and all floor flanges of all sanitary fixtures and all connections between said fixtures and waste or soil pipes, where said connections are on outlet or sewer side of trap, shall be made without the use of red lead, putty, plaster, cement or any other similar substance."

Sec. 106. "All earthenware traps must have heavy brass floor plates, soldered to the lead bends, or, where brass or iron pipes are used, to be screwed to the same and bolted to the trap flange, and the joint to be made gas-tight without the use of red or white lead or any similar substance or rubber washers, the use of which, in the making of said connections, is hereby prohibited, and no device for such connections will be permitted to be used unless it has been approved by the Bureau of Buildings."

EASTERN TRADE ASSOCIATION PLAYS GOOD GOLF.

The Eastern Trade Golf Association held its fall tournament at the beautiful links of the Knollwood Country Club, at White Plains, N. Y., on Thursday, October 15, a large party gathering at the Grand Central depot to take the 9:08 train for the club grounds, which were reached at 9:50.

The golfers found the grounds in excellent condition for play and the weather was all that could be desired. This and the fact that the attendance was large and the gallery enthusiastic made the day one of unalloyed enjoyment.

After the qualifying round the contestants played off eighteen holes, medal play, the championship cup going to Frank H. Simmons, by a score of 83, F. C. Jennings being runner up on a count of 84.

In the second flight F. B. Barrett won the cup on a score of 89, A. W. Maine securing the runner up cup on 98.

Howard Walton carried off the third flight on 96 holes and A. A. Ainsworth took 117 to prove himself the runner up.

In the fourth flight P. H. Seward got the cup with 110 and Jno. S. Simmons won the runner up with 127.

The "Duffers'" cup, in fifth flight, went to Gilbert G. McDuff on a score of 141, W. S. Appleton coming in as runner up with 149.

The cup for the best 36 holes was won by F. C. Jennings, in 166, and the cup for approaching and putting went to F. B. Barrett.

The duffers' cup was re-donated to the association by G. G. McDuff in perpetuity, each winner to keep it only one year.

THE METAL DISTRICT BOWLING LEAGUE.

The Metal District Bowling League opened their season's tournament at Maurice & John's alleys, Nassau street, between Fulton and John streets, New York City, on Tuesday, October 12. An unusually large crowd was in attendance and a spirited contest called forth much enthusiasm during the games.

Many of last season's familiar faces were seen and many expressions of satisfaction were heard on this, their opening night. The prospects are excellent for an enjoyable tournament.

T. H. Burnet, president; L. C. Giles, vice-president; J. R. McMann, treasurer, and E. L. Davis, secretary, have arranged a very complete schedule of games for this season, being Tuesday, Wednesday and Thursday evening of each week, from October 13, 1903, to March 24, 1904.

All of the teams are from the most prominent houses in New York City, and the officers are gentlemen who know how to conduct a bowling league successfully.

Fifteen teams are represented in this league tournament and in their new alley will play for the following prizes:

First team prize, value $30; second team prize, $25; third team prize, $20; fourth team prize, $15. Individual first average prize, $12; second prize, $8; third prize, $5; fourth prize, $3.

High score prize for team, value $5. High score prize for individual, value $5.

Greatest percentage of spares by individual prize, value, $5. The scores made the first night were as follows, viz.:

First Game—M. B. Bryant & Co. Bowling Club—Miller, 185; Klusimer, 149; Tunis, 127; Beyer, 154; Leimbach, 153. Total, 768.

Royal Baking Powder Company Bowling Club—Vanderboget, 170; Dimock, 130; Sherlock, 157; Helmstead, 131; Brady, 174. Total, 762.

Second Game—Royal Baking Powder Company Bowling Club—Vanderboget, 132; Dimock, 163; Sherlock, 200; Helmstead, 153; Brady, 175. Total, 823.

Corlies, Macy & Co. Bowling Club—Geile, 186; Hatten, 122; Miles, 162; Myers, 164; Garrison, 149. Total, 733.

Third Game—M. B. Bryant & Co. Bowling Club—Miller, 179; Klusmier, 182; Tunis, 131; Beyer, 130; Leimbach, 176. Total, 798.

Corlies, Macy & Co. Bowling Club—Geile, 126; Hatten, 169; Miles, 177; Myers, 124; Garrison, 184. Total, 780.

MILLIONS NEEDED TO MAKE SANITARY CONDITIONS BETTER IN GREATER NEW YORK.

Water Commissioner Monroe has asked for $5,168,494,12, an increase of $574,158.94. Most of the increase is for Manhattan and the Bronx, Brooklyn's share being $17,746.65.

Tenement House Commissioner de Forest wants for next year $796,650, an increase over the appropriation for this year of $330,216.92. Accompanying the estimate of Commissioner de Forest is this interesting statement:

"It is now for the first time possible to base such an estimate on full knowledge of existing violations of law and actual experience in the task of remedying them, and

of transacting at the same time the every-day work of the department.

"About a year has now passed since the organization of the department was first made possible by the qualification of its employes. During that time all the tenement houses in New York have been examined and their condition ascertained. During that time, also, the volume of the current work of the department has become manifest. The situation which confronts the department with its present force should be clearly stated, so that its bearing upon the departmental estimate for the coming year may be fully understood.

"Tenement conditions in many instances have been found to be so bad that the most sensational newspapers of the city would hesitate to publish photographs of them. Vile vaults and sinks, foul cellars full of rubbish, in many cases of garbage and decomposing fecal matter, dilapidated and dangerous stairs, plumbing pipes that contain large holes emitting sewer gas through the houses; rooms so dark that one cannot see the people in them, cellars occupied as sleeping places, dangerous bakeries without proper protection in case of fire; pigs, goats, horses and other animals kept in cellars; dangerous old fire traps without fire escapes; disease breeding rags and junk stored in tenement houses; halls kept dark at night, endangering the lives and safety of the occupants; buildings without adequate water supply—the list might be added to almost indefinitely.

"There are in Greater New York over 350,000 dark rooms without any windows opening to the outer air or even to another room which itself has windows opening to the outer air. Moreover, these rooms are located in over 40,000 different tenement houses scattered throughout the different boroughs. Under the law, a large window, 3 feet by 5 feet, must be cut into each such room."

Mutual Aid Association Holds Annual Outing.

The E. W. Bliss Mutual Aid Association, Brooklyn, N. Y., held their annual outing Saturday, September 26, at Ridgewood Park. The proceeds were for the benefit of the association. Tickets were 25 cents each, and about fifteen hundred of their gentlemen and lady friends were there to enjoy themselves. Professor Jacobs' orchestra furnished the music, and dancing was kept up until late at night.

The sport of the day was the different games, participated in by many present. The 100-yard dash, with a prize of silver cake dish, was won by W. A. Smith; time, 11 seconds. The half-mile run came on, and a spirited contest was made, C. P. Weiz, captain of the John Simmons Company's Diamond "S" Relay Team, with a neat spurt came in first, time 2 minutes 14½ seconds, and won the first prize, a silver loving cup.

Then followed the three-legged race, in which the E. W. Bliss men carried off the prize, a small silver cup; time 17 seconds.

In the bowling contest quite a number took part. The prizes were a gentlemen's silver butter dish and a ladies' silk umbrella, each contestant being allowed to bowl three balls.

Then one of the most interesting events of the day came off, being the relay race between E. W. Bliss & Company's team and John Simmons Company's team, and the run was one mile, for a handsome silver cup, and, as each firm think theirs the best team, much interest was displayed, and both had their rooters there, and they did all that could be expected, but the struggle soon ended, after a hard contest, by the John Simmons Company's Diamond "S" team doing the trick in 3:43, thus earning the beautiful silver cup. The names of the members of this Diamond "S" Relay Team are: Capt. Charles P. Weis, Harry Lydecker, Wm. A. Smith, Robt. L. Easson and Fred J. Brown. This team has been fortunate in all the races they have entered this season.

Ball game and other games were indulged in and everybody seemed to have a splendid time, the committee deserving much credit for this successful outing.

The John Simmons Co.'s Racing Team. The "Diamond S."

A number of firms had representatives present, among which we noted: The Lidgerwood Manufacturing Company, the National Steam Pump Company, Ronalds & Johnson Company, Brooklyn; John Simmons Company, of New York, and others.

The E. S. Wheeler & Company Failure.

Schedules were filed in Bankruptcy Court on Thursday, October 1, for the E. S. Wheeler & Company, jobbers in plumbing supplies at New Haven, Conn., and New York. This step was decided upon at a meeting of the board of directors of the defunct company as the best way to protect all the creditors. The liabilities amount to $280,000, and the assets are said to be in the neighborhood of $230,000.

Some of the New Haven banks hold the firm's paper and are secured. They include the City Bank, Tradesmen's and First National. The Yale Bank and the County Bank hold a small portion of the firm's paper. There are about one hundred and fifty creditors.

The E. S. Wheeler & Company was organized in 1888 and the capital stock is owned by members of the E. S. Wheeler family. The capital stock was only $25,000 and the company depended upon the standing with the banks and merchandise on hand for the transaction of its business.

The petition in bankruptcy was signed by the following creditors: James W. Winans, $600; James E. Wheeler, $175, and C. W. Blakeslee & Sons. Some of the other creditors with the approximate amount due them are the following: Union Lead & Oil Company, $10,000; McMann & Taylor, $1,800; Standard Sanitary Manufacturing Company, $11,000; Crane Company, $6,000; John Simmons Company, $2,000; H. B. Olmstead Company, $5,000; W. S. Emery, $250; Central Foundry Company, $6,000; John Trageser Steam Copper Works, $300; Brooklyn Range & Boiler Company, $4,500; Colwell Lead Company, $300; Eugene Bell, $90; Acme Sanitary Pottery Company, $3,400; Day Metallic Manufacturing Company, $400; Riverside Pottery Company, $6,000; Fidelity Pottery Company, $3,000; Shwab Brothers Company, $300; American Pin Company, $8,000; Gadsden Pipe & Foundry Company, $10,000; Thomas Maddock & Son, $1,800; Ironsides Pottery Company, $500; A. Weiskittel & Son, $500; Iron City Sanitary Manufacturing Company, $4,000; Day-Ward Company, $6,000; Marks, Lisberger & Son, $2,000; B. Lisberger & Co., $1,000; R. W. Read, $900; Geo. Taylor, $300; Henry McShane Manufacturing Company, $2,000; Henry Stein, $200; Behrer & Company, $100.

Nothing which has happened in trade circles during recent years has been the subject of such general discussion as the Wheeler failure, the widespread influence of which will be felt in all parts of the country, as the company had open accounts with a surprisingly large number of manufacturing concerns.

A meeting of the creditors of the E. S. Wheeler & Co., New Haven, Conn., and New York, was held in room 74, Astor House, on Monday, October 12. At 2 o'clock the room began to fill up until every seat was taken, and fully eighty, a majority of the largest creditors, were present from all parts of the country. During the first half hour groups gathered and discussed the failure in all its different phases, the probable outcome and what would be best to do under the circumstances. Some of the creditors laughed and joked, while others wore a serious expression, showing they did not feel comfortable at the prospect of the loss of most of their claims.

Then W. A. Myler, secretary of the Standard Sanitary Mfg. Co., took the floor and opened the meeting with a few remarks regarding the object of the meeting and offered a motion that William L. Rogers of the Central Foundry Co. be appointed chairman of the meeting. This was carried, and James F. Conran was appointed secretary, after which the chairman stated that himself, with Messrs. English and Conran, visited the E. S. Wheeler & Co., New Haven, Conn., and received a general statement from Mr. Wheeler and looked over the stock on hand there, and found that the stock of goods were such that with proper management they could be sold at reasonable price, there being a pretty good assortment, valued by Mr. Wheeler at $70,000, and unpledged accounts supposed to amount to $45,000, with which to pay creditors $274,-100. The liabilities are likely to be somewhat larger, as there are so far 364 claims put in, and they had sent out 290 notices of the meeting to be held.

A letter from E. S. Wheeler to the creditors was then read, stating that the liabilities, $290,000, with assets $107,000, would pay 36½ per cent of the debt, and offered to pay 35 per cent as a settlement, 3 per cent January 1st, 1904, and balance in twelve equal payments, and at the end of five months take an inventory, and if estate had not increased the creditors to take possession and divide up assets. He also offered to make up monthly statements of sales and earnings, etc. This offer was laid on the table, and W. A. Myler then offered the following motion:

"Resolved, That it is to the interest of the creditors of The E. S. Wheeler & Company that the business and assets of said Company be liquidated in the bankruptcy proceedings now pending, and that no composition of the claims of said creditors against said Company be made or accepted.

"Further Resolved, That the representation of the creditors of said Company and the protection of their rights in said proceedings be entrusted to a committee of seven persons, and that all of the creditors of said Company be recommended to appoint said committee their proxies and attorneys in fact to represent them at all meetings of the creditors of The E. S. Wheeler & Company, and to vote for a trus-

tee at any meeting called for such purpose and in all other matters and respects to act for said creditors.''

The following committee was then selected and appointed:

William L. Rogers, of Central Foundry Co.

Robt. Campbell, of Gadsden Pipe & Foundry Co.

L. H. English, of C. S. Merick & Co., New Haven.

James F. Conran, of Standard Sanitary Mfg. Co.

Richard Sheldrick, of Union Lead & Oil Co.

Geo. A. Driggs, of American Pin Co.

F. E. Lally, of Crane Co.

The committee then met together and decided to put in the name of Nathaniel R. Bronson, attorney, of Waterbury, Conn., as trustee and permanent receiver of the company. The committee will also visit E. S. Wheeler & Co.'s plant and examine into everything. It is said the methods of the company in doing business were at least unusual. A large part of the accounts receivable are said to have been regularly assigned to the banks, together with the firm's commercial paper at 6 to 8 per cent discount, and as the firm states that it was doing business on a 15 per cent margin, the only wonder is that they were able to keep up so long. It is said that commercial rating of $75,000 and the endorsement of the New Haven banks whenever asked as to the firm's credit enabled them to buy largely in all parts of the country even after the more conservative manufacturers had refused to sell them except for cash.

The committee appointed by the creditors will make a thorough investigation of the affairs of the company and report back at an early date.

Following is the statement submitted by Nathan S. White, secretary of the company, to the meeting of creditors. It is claimed that investigation will probably show that Mr. Wheeler has taken too roseate a view of the situation, and that the real condition of affairs will not warrant creditors in expecting so large a dividend on their accounts:

Merchandise debts (Open accounts and notes.)	$170,000
City Bank shortage	15,000
Yale Bank shortage	5,000
First National Bank shortage	1,500
Merchants' Bank shortage	6,000
Tradesmen's Bank shortage	1,000
Mechanics' Bank shortage	200
County National Bank shortage	500
Farmers' & Mechanics' Bank shortage	400
J. B. Moors & Co.	2,500
C. S. French & Co., notes	10,000
A. Van Millengen	18,000
Estate Ella W. Wheeler	35,000
Lucy P. Wheeler	4,000
Grace W. Kitchell	5,000
	$274,100
Unpledged accounts	$ 45,000
Inventory	70,000
	$115,000

NEW JERSEY

WILL MAKE PIPE CUTTERS AND PIPE VISES.

The Curtis & Wilson Company, of Bayonne, N. J., have been incorporated with a capital of $20,000, by George W. Curtis, of Bayonne, N. J., and Franklin P. Curtis, of New Brighton, N. Y.

USES HIS FINE HORSE.

A. C. Winant, of 200 Clinton avenue, West Hoboken, N. J., was seen in New York city, this week driving his $2,500 horse getting plumbing supplies for a number of jobs, which he and his men are at work on.

MADE EXTENSIVE IMPROVEMENTS.

The E. A. Williams & Son Brass and Bell Foundry, at 105-11 Plymouth street, Jersey City, N. J., have recently enlarged their plant to enable them to obviate the delays often experienced in the furnishing of brass, phosphor-bronze and aluminum castings. They claim that they have equipped their foundry so that they are in a position to furnish these goods while the buyer waits.

SANITARY POTTERS MEET.

The sanitary pottery manufacturers held a three days' session September 22-24 at Trenton, N. J. Two members, it is said, recently withdrew from the association on account of their allotment not being sufficient. It is said a reorganization was effected satisfactory to all, and both the firms came back and one new firm joined. There are prospects that the manufacturers not now members will come in this year. The recent reduction of 10 per cent stands for the present. Most of the sanitary pottery manufacturers at Trenton claim to be busy.

which they ever partook. The trip was made in royal style upon Sexton's big tallyho, drawn by four horses, and a rapid drive served to increase an already healthful appetite. A new rule went into effect at the dinner. It was that every member present should make a speech and every one did. There was liberal applause for each effort.

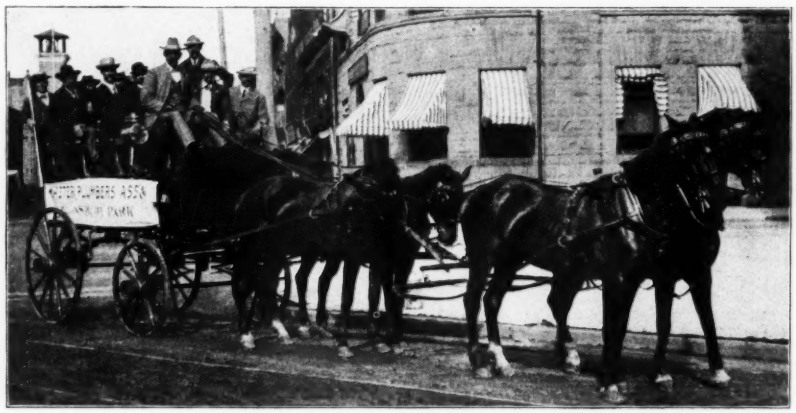
Even though the rain did catch the excursionists on the way home and soak them to the skin, their enthusiasm was not wilted and the occasion was voted such a success that its repetition as a yearly event was demanded by all. The stipulation was made, however, that the same able committee, Joel Boyce and J. Edw. Flitcroft, should have charge again.

THROUGH NEW JERSEY.

At Monmouth Beach, Monmouth county, the general contract for the erection of the handsome summer home of Hugh M. Cramp, Jr., has been awarded to C. V. Schropshire.

OPERATION WORK.

James F. Walton, of 201 Main street, Camden, N. J., is just finishing the plumbing in thirteen houses on Mt. Ephraim avenue for William Sweeten.



Asbury Park Master Plumbers on First Annual Outing.

PLUMBING INSPECTOR USES STRIKING ARGUMENT.

A meeting of the Board of Health at Long Branch, N. J., broke up in a row Saturday night, Oct. 3, after blows had been exchanged. As an evidence of this R. C. Adamson, Jr., one of the members of the board, is nursing a black eye inflicted by Plumbing Inspector Morris C. Burns. The latter declined to say anything about the affair, and Mr. Adamson was equally reticent, though he remarked that he had been ''up against it.''

C. H. Rudloff, an Eberon plumber, was before the board in search of information. Mr. Adamson is a plumber. So is Mr. Burns. Mr. Adamson was trying to give Mr. Rudloff the information desired. There were a few hot words, and soon Mr. Burns was striking Mr. Adamson.

Janitor Abram Sherman shouted: ''You can't fight here. You must go outdoors,'' and then peacemakers interfered.

ASBURY PARK MASTER PLUMBERS ON FIRST ANNUAL OUTING.

The members of the Master Plumbers' Association of Asbury Park, N. J., held an exceedingly enjoyable outing at the Highlands of Navesink on Thursday, September 17, where they partook of a shore dinner and clambake that will ever remain famous with the diners as the most delicious meal of

HAS NICE HEATING CONTRACT.

Jacob Liabelle, of 58 South Orange street, Newark, N. J., is installing a heating plant in the fine residence of Gottfried Kruzer.

HAS TWO NICE CONTRACTS.

Michael Walsh, of 402 Market street, Gloucester, N. J., is installing the heating and plumbing in two houses at Morris and Willow streets, Gloucester, for George A. Casey.

ACETYLENE LIGHTING IN SOUTH AFRICA.

As was anticipated by us some years ago, says the *British and South African Export Gazette*, acetylene has a distinct career open to it in South Africa in places where circumstances do not allow of the erection of electric light installations. Recent advices from the Transvaal point out the big business which is now being done by Johannesburg firms in supplying plants and fittings, for installation in the suburban townships and in the towns along the Reef. The light was originally regarded with a great degree of suspicion and skepticism, but now all this is changed. Whether as a permanent service, or temporary, pending the introduction of the electric light, acetylene, by the ease with which it lends itself to adoption, has crept into public favor, and we have no doubt that still wider vogue than at present lies before it in South Africa.

Boston and New England

Office: 32 Oliver Street

JNO. K. ALLEN
President

ELMER CRAWFORD
General Manager

Representatives, E. W. Barnes
R. G. Barnum

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NEW COMBINED TRAP AND THIMBLE.

James Crawford, of the Crawford Specialty Company, of Boston, Mass., has taken out patent papers on a new combined trap and thimble.

FILTER LITERATURE.

The Naiad Filter Co., Sudbury Building, Boston, Mass., have prepared a very interesting booklet and other literature on the subject of filters.

NEWLY INCORPORATED.

The Acetylene Engineering Company, of Boston, Mass., has been incorporated with a capital of $150,000. Frederick W. Hill, president; Chas. H. Barney, treasurer.

LITERATURE ABOUT TRAPS.

The Sure Seal Trap Co., of Providence, R. I., have begun the manufacture of lead as well as brass traps. They have recently issued a new series of pamphlets and circulars on the trap question.

NEW HEATING COMPANY ORGANIZED.

The Fullum Hydro-Carbon Heating Co., of Boston, Mass., has been organized as the successor to the Jones & Taylor Mfg. Co., with office in Room 512 Paddock building and salesrooms at 46 Washington street North.

M. B. SPOONER COMPANY INCORPORATED.

The M. B. Spooner Co., of Springfield, Mass., successor to the Spooner-Harris Co., has been incorporated, with Myron B. Spooner as president and treasurer. This firm is just entering its second year of business with bright prospects.

GRANTED IMPORTANT PATENTS.

A patent has just been granted to Charles H. Rollins and George W. Knapp, both with the Smith & Anthony Co., of Boston, on a siphon action closet which is said to be basic in its principles and not to infringe in the slightest degree on any previous patents. The new patent, No. 740,662, is attracting a good deal of attention from interested parties owing to the controversy at present being waged over siphon action closets. Details are lacking at the present writing.

WILL REPRESENT PROVIDENCE FIRM.

Harry Costello, of Vineyard Haven, will represent the Field Automatic Faucet & Valve Manufacturing Company, of Providence, R. I., calling on architects and the trade in general in Boston and vicinity.

Mr. Costello was a familiar figure in plumbing trade circles for a number of years, having been with the L. H. Tillinghast Supply Company, of Providence, and with the Dececo Company, of Boston, for several years, lately he has been engaged in other business, but does not come back to the trade, by any means, as a stranger.

WILL CLOSE SATURDAY AFTERNOONS.

As was noted some time ago in these columns, there has been considerable discussion and agitation going on among the boiler and radiator houses in Boston. An agreement was framed and a canvass of the several firms made, which resulted in the signing of the agreement, for Saturday afternoon closing the year around by the following firms: American Radiator Co., Wm. H. Page Boiler Co., Gurney Heater Mfg. Co., Pierce, Butler & Pierce Mfg. Co., Smith & Thayer Co., Niagara Radiator Co., Exeter Machine Works, Herendeen Mfg. Co. and J. M. Thayer.

PLUMBING IN FINE RESIDENCE.

Crawford & Nichols, 311 Warren street, are installing a new plumbing system including new fixtures of high grade and modern design in the fine residence at 310 Marlboro street, for the Lucius Skinner estate; they will also install new lavatories and making alterations to the plumbing in the residence of Wm. Farquar, the seedsman, at 78 Harold street, and have just finished installing a complete new plumbing system in the house at 6 Alpine street for F. S. Hodges, which was remodeled from a one-family residence to a three-family house.

WAVERLY HEATING & SUPPLY COMPANY.

The Waverly Heating & Supply Company, which was recently incorporated, as previously stated, is a reorganization of the business conducted by Thomas Gaffney & Co., at 107-109 Blackstone street, Boston, Mass. The new firm consists of Thos. Gaffney, president; E. P. Crawe, treasurer, and W. L. Healey, secretary, and will do a wholesale and retail business in steam and hot water heaters, stoves, ranges and furnaces, and repairs for same, at the same location. Mr. Healey is a son of T. P. Healey, manager of the New England office, of the International Heater Company, of Utica, N. Y.

WERE "THERE WITH THE GOODS."

A short time ago we mentioned the almost incredibly short time in which M. Ahern finished his $18,300 plumbing contract in the English High and Latin school, which, is by the way, one if not the largest school buildings in New England. It should have been mentioned in connection that equal credit was due the James Barrett Mfg. Co., who had the contract for supplying the goods, which included a great number of special fittings and fixtures, maxing it very difficult and taxing them to the utmost to get the goods out in the four weeks allowed in the time limit. They also had the contract for removing, repairing, replating and replacing the brass railing work in the building, which also was done in record time.

They also have the contract for furnishing the goods, including forty-five closets, for the Boston Insane Hospital, at Austin Farms, in which John Manning is doing the plumbing, his contract amounting to something over $12,000.

MEETING OF PLUMBERS AND STEAMFITTERS.

Thomas F. Harvey, president of the Worcester Central Labor Union, was elected president of the Journeymen Plumbers, Gasfitters, Steamfitters and Steamfitters' Helpers' Association of Massachusetts, which was formed in Boston Sunday, Sept. 27, at 514 Tremont street, with 20 affiliated unions.

The convention instructed a committee to investigate the working conditions at the government military and naval stations in Massachusetts, with the intent to ascertain the wages paid and the hours worked. Congress and the departments at Washington will be asked to right any wrongful conditions that may obtain at Charlestown, Watertown or Springfield.

A committee was appointed to solicit the affiliation of all State unions of the National Steam and Hot Water Fitters and Helpers. This national organization had a provisional charter from the American Federation of Labor, but it was revoked recently on the ground that the A. F. of L. does not believe in having two international unions of pipe workers.

The officers elected are: President, Thomas F. Harvey, Worcester; vice-president, C. A. White, Boston; secretary-treasurer, Joseph P. Curry, Lynn; executive board, Michael J. McNulty, Worcester; Edward Riley, Fitchburg; M. J. Scanlon, Springfield; P. P. Griffin, Salem, and M. O'Connell, Newton.

The cities represented at the convention were Boston, Worcester, Lowell, Fall River, Springfield, Northampton, Natick, Gloucester, Quincy, Lynn, Salem, Cambridge, Fitchburg, Brockton, Newton, Marlboro, Waltham, Lawrence, Holyoke and Malden.

THE BOSTON BOWLING LEAGUE.

At a meeting of the members of the Boston Plumbing & Steam Supply Bowling League, called by Chairman Rollins on Saturday, Oct. 3, at which nine teams were represented and the entire twelve heard from, C. E. Rollins was elected president, Mr. F. W. Hubbard, vice president, and Mr. J. Collins secretary-treasurer. The rules and regulations as follows were submitted and adopted:

PREAMBLE.

This organization is formed for the purpose of promoting sociability and good feeling throughout the trades named, and to furnish diversion for its members. Every person connected with the plumbing or steam supply business of greater Boston is eligible to membership.

The organization shall be known as the Boston Plumbing and Steam Supply Bowling League.

RULES AND REGULATIONS.

The officers of this organization shall consist of president, vice president and secretary-treasurer. Officers shall serve without pay, excepting secretary-treasurer, who shall receive thirty dollars for his services.

There shall be a sinking fund of twenty-five dollars set aside for incidental expenses.

Meetings shall be held subject to the call of the officers or any three members.

Representatives of seven teams shall constitute a quorum.

The organization shall consist of twelve teams.

Every member must be in the employ of the firm or company his team represents.

Five men shall constitute a team.

All games are to be bowled on the Chauncey Street Alleys, Chauncey street.

All games are to be bowled under the rules of the Massachusetts Amateur Bowling League. No deviations are to be allowed. Captains are responsible for the rigid enforcement of these rules.

There shall be a referee on the foul line. Any game scheduled, bowled without a referee shall be forfeited.

Games shall be called not later than 8 P. M.

Teams not having a full complement of men to be allowed to start the game with four members, and should the fifth member arrive before the end of the fifth frame, he may be allowed to roll the missing frames and proceed.

Should four men only be present, the game may be bowled with a dummy equal to the lowest score of the opposing team.

There may be made combination teams from the trade press and houses where the employes are not in sufficient numbers to allow a full team to be made from a single house. Under this condition the captain selected must declare his team with substitutes of not more than four members, and shall file a list of the same with the secretary-treasurer. It is understood that no employer of a house represented in the league shall be eligible to membership of such a combination team.

Each team entering the tournament will be assessed ten dollars ($10.00) payable to the secretary-treasurer on or before Nov. 1, 1903.

ADDENDA.

Suggestion to the bowlers, representatives of the firms or companies and all parties interested. These will readily recognize in the true interest of the sport that interference with bowlers while preparing for or bowling his frames must be eliminated.

The schedule embracing forty-four games for each team was then adopted before the names of teams to meet were known, these were drawn by lot and beginning Tuesday, Oct. 6, the tournament starts.

A prize committee will be appointed a little later and it is confidently expected that many handsome prizes will be offered.

FIRST GAMES OF THE SEASON.

With a vast amount of enthusiasm, much hand-shaking and sociability, the bowling season began, Tuesday evening, Oct. 6, at the Chauncey street alleys.

Chairman Chas. E. Rollins, Vice-President F. W. Hubbard and the members of the teams who were to bowl and a great many non-participants, as well, were on hand early, and everything moved off in the very best style imaginable.

The teams were matched as follows:

Smith & Anthony Co.. vs. The Cambridge Plumbing Supply Co., and took "three straight."

The Dalton-Ingersoll Co. vs. the Wm. H. Gallison Co., with the first two games going to the D-I 's, and third to the Gallisons.

Jos. H. Young vs. the Salesmen, with the first two games going to the Salesmen, and the third to the Youngs, by two pins.

The full scores were as follows:

SMITH & ANTHONY CO.				
Brown	82	92	84	258
Trefethen	77	69	90	236
Cleaves	95	88	79	262
Kohlor	81	68	74	223
Annis	72	75	81	228
	407	390	408	1205

CAMBRIDGE PLUMBING SUP. CO.				
Jackson	76	88	77	241
Machol	71	75	75	221
Holton	78	63	61	202
Cops	67	78	56	201
Lane	77	99	69	245
	369	403	338	1110

* * *

DALTON-INGERSOLL CO.				
Hall	58	73	76	207
D. Collins	85	69	80	254
J. Collins	79	86	85	250
Eaton	91	75	86	252
T. Collins	63	71	67	201
	376	374	304	1144

WM. H. GALLISON CO.				
Wall	63	78	60	201
Peacock	68	46	73	187
Wiggin	73	73	84	250
Rankin	79	59	79	217
Kenney	75	75	70	220
	358	331	366	1055

* * *

JOS. H. YOUNG.				
Bradbury	74	79	72	225
Dempsey	75	71	72	218
Young	77	69	77	221
Somers	60	50	54	164
Mathews	42	54	97	193
	328	323	372	1023

SALESMEN.				
Chamberlain	79	86	75	240
Stokes	64	76	73	213
Jack	60	59	76	195
Emery	68	84	98	250
Barnes	57	48	48	154
	328	353	370	1051

As will be noticed, there was a tie in the first game between the Youngs and Salesmen, in which the Salesmen won the roll-off—71 to 54.

A glance at the score will show that good strings were the rule, and poor ones the exception.

The highest single string being that of the S. & A.'s in the third game—408—they also took the highest three-string total, of 1,205.

The highest individual single score going to Emery of the Salesmen's team with a string of 98, and highest individual three-string total going to Cleaver of the S. & A.'s with a score of 262.

On Thursday evening, Oct. 8, four teams were on hand at the alleys, the Brown-Wales Co.'s team withdrawing that afternoon, so the game with the Thos. Hoey Sup. & Mfg. Co. had to be postponed.

Locke, Stevens & Co., however, are entering a team, which will take their place, and the game between the two teams will be rolled off shortly.

Following is the score for Thursday evening:

F. W. WEBB MFG. CO.				
Geo. Maynard	76	79	64	219
McLaughlin	86	73	72	231
Sullivan	73	66	81	220
J. A. Maynard	84	91	69	224
Connell	85	84	85	254
	404	393	371	1168

W. B. HUBBARD & SONS CO.				
H. P. Hubbard	77	78	65	220
Sheriff	75	78	70	223
Stokes	89	67	67	223
F. W. Hubbard	75	72	64	211
McAuliffe	81	113	84	278
	397	408	350	1155

* * *

JAMES BARRETT MFG. CO.				
Hurley	82	77	75	234
Santo	76	88	88	252
Buckley	91	80	77	248
Roache	77	77	61	215
O'Brien	75	81	70	226
	401	403	371	1175

THE PECK BROS. & CO.				
Casey	81	61	84	226
Stanwood	83	77	72	232
Durkee	82	80	92	254
DeBussey	76	76	75	227
Thompson	76	72	92	240
	398	386	405	1189

* * *

From the score it will be noted that the Webbs won two from the Hubbards and the Barretts, two from the Pecks, and that the scores in all of the games were very close.

Both the high individual single and high three-string totals went to McAuliffe of the Hubbard team with 113 and 278 pins down to his credit, respectively.

There seems to be no lack either of interest, enthusiasm or good material, and the prospects for a large amount of good sport and sociability during the season, are most assuring.

DEATH

COTTON.

George H. Cotton, assistant treasurer and a director of the American Tube Works in Somerville, Mass., died at his summer home in Waverley Saturday, Oct. 10. He had been in poor health for some time.

Mr. Cotton was born in the old Webster house, Summer street, Boston, 62 years ago. He was educated in the Chauncy Hall school and after graduating entered the dry goods business, but in a short time was appointed to a responsible position with the American Tube Works. He was twice married and leaves a widow, two sons, Henry W. and Joseph H., who are at the works; a stepson and step-daughter.

Mr. Cotton was a member of the Country Club in Brookline, the B. A. A. and the Boston Art Club. Funeral services were held at his Boston home, 403 Marlboro street, Monday, Oct. 12, and the burial took place at Forest Hills.

FARRELL.

Michael F. Farrell passed away at his home at 177 Webster street, East Boston, Mass., on Tuesday morning, September the 29th, after an illness of three weeks.

The funeral was held Friday from the Church of the Assumption, in East Boston, and was attended by a large delegation of the Boston Master Plumbers' Association, of which the deceased had long been a faithful and active member.

The floral tributes were many and profuse, a very attractive piece in the form of a broken link, being sent by the members of the association.

Deceased was born in Boston, 51 years ago, but before he was ten years old removed to East Boston with his parents, and has since resided there, having successfully conducted a plumbing business at 188 Summer street, for a number of years, which he still maintained at the time of his death. He leaves a wife and three children to mourn his loss.

CLEANING

whether given frequently by the careful housemaid or strenuously by the zealous janitor, does not destroy the original brightness of

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WATERBURY, CONN.

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He was a whole souled citizen and prominent in social as well as business circles in East Boston and leaves a host of friends behind, with whom DOMESTIC ENGINEERING joins in extending sympathy to the bereaved family.

MASSACHUSETTS

ABBINGTON.

Geo. E. Gormley is doing the plumbing in the new Y. M. C. A. building being erected in North Abbington; the plumbing and heating in two new houses being erected in Rockland, Mass., and installing new heating systems in several houses in place of those removed, as well as being very busy with a good line of jobbing in both lines.

HOLYOKE.

The Kennedy & Sullivan Mfg. Co., 73 Main street, have been awarded the contract for the plumbing in the new block, containing two stories and twenty-five apartments, to be erected for John O'Connor at Pine and Dwight streets. They are also doing the plumbing in the new $5,000 residence being erected in Easthampton for W. L. Pitcher.

MAINE

TO DEAL IN PLUMBING SUPPLIES.

The Perfecto Specialty Company has been organized at Mechanic Falls, Me., and incorporated with a capital of $10,000. Incorporators: Louis H. Shattuck, treasurer, Gardner, Mass.; Jesse M. Libby, president; Alfred C. Andrews, Mechanic Falls.

SLATE COMPANY INCORPORATED.

The Monson Maine Slate Co. at Augusta, Me., has been incorporated with a capital of $450,000; nothing paid in. The president is Chas. J. Weir, and treasurer Horace Mitchell. Directors, Chas J. Weir and H. F. Eastman, of Lowell, Mass.; Horace Mitchell, of Kittery, Me.; H. W. Waite, of Brookline, Mass., and G. F. Barnard, of Worcester, Mass.

RHODE ISLAND

LARGE PLUMBING JOB COMPLETED.

P. J. Murphy & Co., of Newport, R. I., have just completed the plumbing for Mr. R. C. Vanderbilt at Sandy Point farm, consisting of his residence, stables, gardener's cottage, and a separate building erected for servants' quarters, making in all one of the largest jobs of plumbing ever done in this vicinity. A large number of plumbers have been employed on this work since last November.

PAWTUCKET MASTER PLUMBERS REMAIN FIRM.

The Master Plumbers' Association of Pawtucket, R. I., has again voted not to sign the articles of agreement which were submitted to them over twenty weeks ago by the Pawtucket Journeymen Plumbers' Union, No. 29, as individuals. Althoough one large firm broke away from the ranks of the Masters' Association the past week, and granted the employes an increase from $3 to $3.50 per day of eight hours, by signing the journeymen union's scale, the other members of the association decline to follow suit. Some of the masters allege that they are willing to grant the increase in the daily wage which is requested by the journeymen, but they declare that they will not allow their employes to dictate to them regarding whom they shall employ.

Philadelphia

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JNO. K. ALLEN
President

ELMER CRAWFORD
General Manager

Representative, E. DeForest Winslow.

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A NEW RECRUIT.

J. Evans has opened a neat plumbing shop at 2600 Ridge avenue.

RESIDENCE HEATING.

John Gormly, of Columbia avenue, is installing a hot water heating plant in a residence at the southwest corner of Seventeenth and Allegheny avenues.

A BUSY HEATING CONTRACTOR.

John C. F. Trachsel, of 320 Arch street, is installing an extensive steam heating system in the store of Williams, Brown & Earle, at 916-18 Chestnut street.

ADDITIONAL PLUMBING WORK.

John A. Quinn, of 1613 Unity street, Frankford, has been making considerable alterations and additions to the plumbing work in the mill of James Bromley.

OPERATION WORK.

William Doran, of 3420 Frankford avenue, has on hand the plumbing for an operation of six houses on Emerald street, south of Venango, for C. Sporla.

INSTALLING NICE BATH ROOM.

Frank Kramer, of 959 North Eleventh street, is equipping a very neat bath room in the residence of Theodore L. Warfel at 916 North Thirteenth street.

A NEAT CONTRACT.

B. F. Horn, of 28 North Fifth street, has just completed the equipment of a fine bath room at 2316 North Broad street, in the residence of David Netter, the liquor dealer.

PLUMBING AND HEATING FOR LARGE CHURCH

David Ross, of 1518 W. Susquehanna avenue, has been awarded the contract for the plumbing and heating in the Ebenezer Methodist Episcopal Church at Fifty-second and Parrish streets.

EXTENSIVE REMODELING WORK.

Jacob Zimmerman, of 1524 Sansom street, is at present at work upon the remodeling of the residence of Dr. Roberts at 313 South Seventeenth street, using nothing but first-class material.

WILL REMOVE.

Charles Weideman, of Cambria and Tulip streets, will remove to 3013 Kensington avenue, between Clearfield and Orleans streets and opposite McPherson Square, where he will have a very neat store.

PLUMBING FOR LARGE CHURCH.

Thomas J. Cunningham, of 4324 Frankford avenue, has been occupied for some time with the installation of an entire new plumbing system in St. Lawrence's Polish Catholic Church at Memphis and Vienna streets.

PLUMBING FOR RESTAURANT.

James T. Moyer, of 22 North Eleventh street, has just completed the installation of a very elaborate plumbing equipment in J. J. Stull's new restaurant at 23 North Eleventh street, in which the finest fixtures procurable were used.

INSTALLING PLENTY OF HEATING SYSTEMS.

The Monitor Steam Generator Company, of North Seventh street, are installing a low-pressure steam heating plant in a structure at 8 and 10 Strawberry street, for William S. Schoenemann and the same style of a system in a building at Eighth and Race streets for George Davis.

LARGE CONTRACT LET.

John Butler, of 932 Spring Garden street, has the contract for the plumbing in the Girard hotel at 801-09 Race street. The house contains 200 rooms. Shower baths will be installed throughout, nothing but first class material being used. The J. S. Makin Heating Company, in the Builders' Exchange, has the heating contract.

EXPERT PLUMBING WORK.

Probably one of the nicest jobs in the plumbing line completed lately was the plumbing for the palatial residence of Clement B. Newbold at Jenkington, the work being done by Wm. Newell & Bro., of 1713 Sansom street. The plumbing contracts alone amounted to about $10,000. Guy Lowell, of Boston, drew up the plans.

SEEK NEW QUARTERS.

Newman & Harris have moved from the Real Estate Trust Building to large and handsome offices in the Land Title Annex Building, at Broad and Sansom streets.

McIlvain & Roberts, being cramped for room and to accommodate their increasing business, have moved from 1502 Land Title Building to Rooms 1517-18 Land Title Annex.

LARGE CONTRACT PROCEEDING NICELY.

Francis Bros. & Jellett, of North Broad street, who are installing the heating in the Mint Arcade Building at Chestnut and Juniper streets, are proceeding nicely with that contract.

William McCoach, of 1607 Sansom street, is plumbing this building. This end of the work will include the installation of about 75 closets, 300 lavatories and 25 urinals.

PLUMBING AND ROOFING WORK.

Joseph A. Wilt, of 2224 East York street, president of the North East Association of Master Plumbers, is engaged on a good contract, amounting to more than $1,000, for plumbing and roofing the new residence of Wm. Lindig, at York road and Fisher's lane, of which George Kessler is the architect and builder. The two bath rooms contain decorated fixtures, one room having a separate shower. The kitchen and laundry plumbing are up-to-date.

INSTALLED A $5,000 BATH ROOM.

Thomas G. Moore, of 427 South Broad street, has a faculty for securing fine work. One of his most recent jobs was the fitting up of an elegant bath in the residence of John P. Matthews at 1605 Allegheny avenue. Its equipment included all solid porcelain ware and the most expensive fixtures that money could buy. The walls were all in tile with ornamental frieze and inlaid mirrors. The installation of this bath room alone amounted to $5,000 or $6,000.

CHOOSE DELEGATES.

In accordance with resolution adopted at the quarterly meeting of the Master Builders' Exchange, 18-24 South Seventh street, on Sept. 22, 1903, the President, John S. Stevens, has appointed the following delegates and alternates to attend the convention of Builders' Exchanges of the State of Pennsylvania to be held at Scranton, Pa., on January 13th and 14th, 1904.

Delegates: Messrs. John S. Stevens, John Atkinson, George Watson, Henry Reeves and Franklin M. Harris.

Alternates: Messrs. J. Lindsay Little, Thomas F. Armstrong, Wm. H. Albertson, John D. Carlile and John R. Wiggins.

AMONG THE PLUMBERS.

Charles P. Brady, of 821 North Tenth street, has the contract for the plumbing in the Lutheran Church at Third street and Snyder avenue.

Cornelius McFadden & Co., of North Fifteenth street, have the contract for plumbing in 82 houses, in different sections of the city, for David McKibbon.

J. B. McFarland, of 501 South Tenth street, has been awarded the contract for the plumbing in the Cunningham Piano Co.'s new factory at Fiftieth and Parkside avenue.

Dennis V. Kennedy, of 837 East Chelten avenue, Germantown, is doing considerable additional plumbing in St. Vincent's Seminary in Germantown.

Storch & Scheid, of Broad street and Passyunk avenue, are plumbing an operation of 44 houses at Seventh and Tioga streets.

Harry W. Wilcke, of 920 Filbert street, is plumbing a handsome new building at 24-26 North Ninth street for Carl F. Lauber.

Jas. A. Flynn, of the northeast corner of Thirteenth and Sansom streets, is plumbing a large hotel at Riverside, N. J.

Frank P. Dougherty, of Broad street and Passyunk avenue, is plumbing an operation of 25 fine houses on the north side of Wharton street, between Thirtieth and Thirty-first streets.

PITTSBURGH

TO ISSUE NEW CATALOGUE.

The Standard Sanitary Manufacturing Company, of Pittsburg, Pa., have just placed a contract for the printing of a 520-page catalogue, which is to be issued about February 1, 1904. This will be the finest catalogue ever issued by this company and no labor or expense is being spared to make it the most elaborate.

COMPLETION OF PUBLIC BATH HOUSE DELAYED.

Work on the new public bath house and wash house is being delayed by the strike of the plumbers. The time for the completion of this work, according to the contract, is Jan 1, 1904, but the work has progressed so rapidly that it was thought the structure would be completed by December. The strike of the plumbers has brought about an unexpected delay, however, and it is uncertain now just when the building will be ready for the public.

SCHOOL PLUMBING STILL UNDONE.

The Ralston School of the ninth and tenth wards of this city is still without water and the plumbing remains undone. Superintendent Samuel Andrews of the city public schools appeared before the board on October 1 in the hope of ending the deadlock. He examined the various bids for the plumbing work submitted to the board and agreed that the bid submitted by R. Ramsden was illegal. The matter was put to a vote and the board again split. Three of the members of the board say that Ramsden's bid is legal and that bond will be furnished in any reasonable amount. The other three members say that Ramsden's bid is simply a proxy for A. Henle, whose bid, with one other, was thrown out.

BAILEY-FARRELL'S NEW WAREHOUSE.

The new warehouse of the Bailey-Farrell Mfg. Co. at Third avenue and Ross street, Pittsburgh, Pa., is progressing satisfactorily and it is expected will be ready for occupancy by April, 1904. The building will be eight stories in height, of brick and steel fireproof construction, and will contain 80,000 square feet of floor space. Every feature of improvement will be embodied in the construction. Electric elevators will be placed at each corner of the structure in the front, one for passengers and one for freight, there being four elevators in all. The show room will be on the top floor, half of the same being used for this purpose and half for office purposes. There will be two large shipping doors opening on Third avenue and one on Ross street. The size of the building will be 72x126 feet. It is estimated the building will cost when completed $200,000. Stinson, Kennedy & Co., of Pittsburgh, have the plumbing contract for the structure. The A. & S. Wilson Co., of the same city, are the building contractors.

PITTSBURG PLUMBERS OUT ON STRIKE.

The plumbers in the Pittsburg district went out on strike on Thursday, October 1. Building operations will probably be hampered for some time to come, as the workmen and the Master Plumbers' Association, the opposing forces, are determined to fight the issue. The plumbers are members of Local No. 27. They number 782, and of this number scarcely 82 have been granted the scale demanded. In addition to the plumbers about 300 apprentices are affected, making the total number of men out about 1,000.

About two months ago the plumbers presented their scale to the master plumbers. It was practically the same agreement as has been in force, with the exception that 50 cents more a day was specified. Previously the day's wage for a plumber has been $4. The Builders' League, in an effort to have all scales mature at the same time, tried to arrange with all labor organizations to agree upon a certain date, and specified December 31. The plumbers' scale has always matured on September 30, but they were willing to concede the change to the Builders' League, if the master plumbers would grant them an advance of 50 cents a day.

The master plumbers refused to accept the scale, and as it matured September 30, the strike became effective October 1. A few firms, not connected with the Master Plumbers' Association, have signed the scale, but the number of men they employ is insignificant compared to the association.

PENNSYLVANIA

GET HOTEL WORK.

Mitchell & Busby, of Washington, Pa., have secured the plumbing contract in the new hotel being erected at Washington.

SECURES NICE CONTRACT.

R. J. Stewart, of Brownsville, Pa., has secured the plumbing contract for seven new residences being built at Brownsville.

TO RECEIVE PLANS FOR PLUMBING AND HEATING WORK.

The supervising architect of the Treasury Department will receive until Oct. 22 plans for the plumbing and heating in the United States Post Office at Kirksville, Pa.

WIN PARTIAL VICTORY.

The striking plumbers and sheet metal workers of York, who have been out for four weeks, have won a partial victory. Their demands for nine hours and recognition of the union have been acceded to by twelve firms.

STRIKE STILL ON.

Culler & Miller, of Monessen, Pa., are still contending with the strike trouble that has interfered with their work at Monessen. It is reported that they are not able to hire any plumbers, either union or non-union, owing to some hitch in the way of coming to an agreement, and the principals of the firm are endeavoring to carry on the work themselves.

WORK FOR PLUMBING REGULATION AT HARRISBURG.

A measure regulating plumbing work in the city of Harrisburg, Pa., accompanied by a memorial from the Harrisburg Union of Journeymen Plumbers, was introduced in the city council at its last meeting.

ALLEGHENY PLUMBER IS FREED.

I. V. Hoag, the plumber of Allegheny, Pa., who has been in the Allegheny county jail since last March, was released from jail this week and may never be tried for the death of Joseph Colbert.

Colbert was killed during a quarrel on Lacock street, Allegheny, March 22. He was taken to the Allegheny General Hospital, where he died. His friends claimed that his death was not the result of the fight, but an operation performed at an inopportune time, and there seemed to be no evidence against Hoag.

EXPECT GREAT INDUSTRIAL DEVELOPMENT.

Something in the nature of a boom has struck the town of Indiana, Pa. A company was organized in that town last week to erect and operate a large brass foundry. The officers of the new company are as follows: President, S. J. Telford; secretary, A. P. Lowrey; treasurer, J. W. McCartney. The town of Indiana has since the advent of the numerous coal industries in the section grown considerably and there is no doubt that great things may be expected of this community in the way of industrial development.

HOT WATER HEATING FOR ENTIRE CITY.

Plans are being perfected for the organization of a company to furnish hot water for heating purposes in Chester, Pa. Mains will be laid to all parts of the city and it is claimed that the cost of heating houses, stores and other buildings will be greatly reduced by the method of a central source of distribution.

It is likely that the mains of the Chester Steam Heating Company will be purchased.

While it will not be possible to have the plant constructed in time for service this winter, it will be in readiness for the following year.

PLAN NOVEL SEWAGE SYSTEM.

The East McKeesport Council has a novel plan for perfecting the sewerage system for the city. Under the entire town are abandoned coal mines. The plans now before the council is to have the borough engineer get estimates of the cost of boring holes down through the earth to these abandoned coal mines and have pipes placed through the earth with catch basins at each street corner, through which waste matter that now gathers in pools about the town can be carried to the old mines. The question will come before the borough council at its next meeting.

THROUGH PENNSYLVANIA.

At Dunmore, Lackawanna county, town council has passed an ordinance offering the sale of $25,000 bonds, the proceeds to be used to construct sewers in the Second, Third and Fourth sewer districts.

At Erie, Erie county, the Erie City Iron Works will erect an office building to cost $10,000.

At Homestead, Allegheny county, the Hungarian Reformed congregation have under consideration the erection of a church to cost about $20,000.

At Sharon, Mercer counuty, the contract for the erection of sewers has been let to William McIntyre & Sons, for $22,000.

At Glenolden, Delaware county, an ordinance has been passed for the construction of a sewerage system. The estimated cost is $29,500.

The Western States

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CHICAGO

CHICAGO IN NEED OF PLUMBING INSPECTOR.

With five plumbing inspectors away on leave of absence granted because of their indictment for alleged irregularities and three other inspectors occupied in fighting charges against themselves made by the Citizens' association, which declares they failed to inspect the plumbing in many buildings, Health Commissioner Reynolds of Chicago finds his ranks depleted and has asked the civil service commission to certify five eligibles to him. One is to act as assistant chief deputy inspector and four are to act as inspectors until something is done about the indictments.

WESTERN GOLF TOURNAMENT.

The officers of the Western Trade Golf Association had a meeting recently and decided to hold the autumn tournament in Chicago, Wednesday, October 28, the day following the meeting of the Central Supply Association at Indianapolis. The tournament will be held on the beautiful links of the Midlothian Golf Club. It has been decided to have four flight cups and a prize for the runner-up of the first flight. It is earnestly hoped some of the members of the Eastern Trade Golf Association will be present and try to lift the Russell trophy so persistently held by Charles K. Foster, of Chicago.

WILL INSTALL VACUUM SYSTEMS.

The matter of improving the heating systems in all the county institutions, including the court house and criminal court buildings in Chicago, was taken up by the Board of County Commissioners at their meeting on Monday, October 5. After an investigation of the different systems on the market the contract was awarded on recommendation of the building committee to the Consolidated Engineering Company, 40 Dearborn street, Chicago. Their system of vacuum heating will, accordingly, be installed in the various buildings during the coming year. The total contract amounts to, approximately, twelve thousand dollars.

PERSONAL.

James Mackay, of Kellogg-Mackay-Cameron, has sufficiently recovered from his recent illness to be out again. He was down at the office one day this week.

The marriage is announced of Warren K. Fields, assistant manager of the Chicago branch of the Alberene Stone Co., to Miss Carrie Scott, of Neponset, Ill. Mr. and Mrs. Fields are enjoying a trip in the northwest.

Francis J. Baker, secretary of the Geo. H. Tay Company, San Francisco, is visiting the eastern trade and getting in closer touch with the manufacturing concerns with whom his house does business. Mr. Baker will represent the Pacific coast jobbers at the Indianapolis meeting on October 27. He is accompanied by Mrs. Baker.

The marriage of Miss Emily Hutchinson to R. T. Crane, president of Crane Co., Chicago, was solemnized in Trinity Episcopal Church, Chicago, on Wednesday, October 14. R. T. Crane, Jr., attended his father as best man. Mr. and Mrs. Crane left soon after the ceremony for an eastern trip. They propose returning to Chicago for the holidays and spending the balance of the winter in Pasadena, Cal., where Mr. Crane has his winter home.

EMPLOYERS TO FORM NATIONAL FEDERATION.

A call has been issued for a meeting to be held at the Auditorium Hotel, Chicago, on October 29 and 30, for the purpose of forming a federation of the local Employers' Associations, which have sprung up with such astonishing rapidity in all parts of the country during the past few months.

Prominently identified with the movement and probably the originator of the idea of an organization national in its scope is E. G. Hornbrooke, secretary of the Kansas City Master Plumbers' Association and also secretary of the Employers' Association of Kansas City.

There are in the neighborhood of six hundred employers' associations in the United States, and it is expected that most of them will be represented at the Chicago meeting.

The idea of the new association, says Mr. Hornbrooke, will be to federate all the separate organizations of the sort that they may be mutually helpful. Then, in case of strikes or trouble in one city, the association there may call on similar organizations in other cities for men, advice and possibly financial aid. A closer union will mean a better control of labor, a more practical manner of handling labor disturbances and a fight on boycotts and the like in court instead of arbitration and too much compromising.

The idea seems to be along lines similar to the affiliation of the labor unions, with a central body to advise and in emergency to control, instead of leaving each association to fight its own battles.

PLAN NATIONAL BUILDERS' COUNCIL.

Secretary Craig, of the Building Contractors' Council, of Chicago, is sending out a circular letter to the various associations of building contractors throughout the country urging the necessity for a national organization which shall be to the building trades at large what the local councils are to the trade in their respective localities. The purpose of the Chicago council can best be explained by reprinting the letter in full. It follows:

Building Contractors' Council of Chicago,
Rooms 37-42, 90 La Salle Street.

Gentlemen—Some months ago we corresponded with a large number of contractors' associations in all parts of the country relative to the formation of a National Organization of Building Contractors. About fifteen of the principal cities responded favorably, but it was deemed advisable to defer action until later in the year. The depression in the building industry now being such throughout the entire country and the unusual activity of organized labor prompts us to again bring the matter before the contractors of the country and ask their co-operation toward the perfecting of an organization that will restore the confidence of the building public and place the building industry in a prosperous condition. This prospective organization will in no way conflict with any other employers' association. We think, however, that the interests of the building contractors are such as to demand a national organization composed of building contractors exclusively and embracing every individual contractor in the country. Let there be loyal trade associations organized, then Federal organizations, and if necessary, State organizations.

We had intended to hold a conference the latter part of this month, but have decided to defer the same until about the 12th of next month. Before issuing the call we desire to add as many names as possible to it, and would be pleased if your organizations would consider the matter promptly and advise us if we can use your name. The call will be issued about the 20th inst., and we would be glad to hear from you before that date. Should we not hear from you, however, we will send you an invitation to attend the conference.

Trusting that you will recognize the importance of the industry of uniting all contractors in one common brotherhood, that they may be able to legislate by and for themselves, we remain,

Yours very truly,
BUILDING CONTRACTORS' COUNCIL,
E. M. CRAIG. Sec'y.

In conversation with the DOMESTIC ENGINEERING man, Mr. Craig waxed eloquent on the need of a national organization among the builders. With such an organization such a low-down controversy as that gone through by the Chicago trades in 1900 or that from which New York has been suffering would be impossible, he believes, for the reason that with the backing of the trades over the country at large, any local organization would be too formidable to be encountered lightly by organized labor. With a central office in close touch with trade conditions in all parts of the country substantial help could be given to the local associations wherever labor trouble arises, and the wisdom of the whole trade brought to bear on the vexing problems which now confront the individual contractor.

THE CASE OF WYMAN VERSUS CHICAGO MASTER PLUMBERS.

The eyes of the Chicago trade were all fixed on the proceedings in Judge Walker's court recently in the case of J. Wyman against the Chicago Master Plumbers' Association, the L. Wolff Mfg. Co. and the Raymond Lead Company, for $50,000 damages, growing out of the plaintiff Wyman's alleged inability to secure goods to carry on his plumbing business and his consequent quitting of the business in the year 1899.

The quarrel dates back to the labor troubles of 1897, at which time Wyman was fined $100 and suspended from the Chicago Master Plumbers' Association pending the payment of the fine, which was imposed because Wyman signed articles of agreement with the journeymen's union in violation of the united action of the Master Plumbers' Association.

Wyman considered the fine unjust, claiming that he was forced to make an agreement with the union because of an important contract which he was under bond to complete. For this reason he refused to pay the fine and was, he claims, blacklisted by the Master Plumbers' Association, with the effect that he found it impossible to buy plumbing supplies in the city of Chicago.

Action was brought by the plaintiff against the association in November, 1900, at which time the jury returned a verdict against the plaintiff on the ground that conspiracy to injure was not proven. Petition for a new trial was granted by Judge Clifford and the present case is based on the former trial with the addition of some new testimony.

The case went to the jury Oct. 6, and resulted in a deadlock, the jury remaining out until ten o'clock and then announcing a disagreement. Thus the case rests practically where it stood before this, the second trial, and if Wyman still desires satisfaction at the hands of the defendants to the suit he will have to content himself with another wait of a year or two before the flight of time again brings his case from the bottom to the top of the court's calendar.

In the meantime members of the Association and the officers of the supply houses in question, while they confess that they would have preferred an absolute acquittal also profess that a third trial must of necessity end as the first two have ended, for the reason that Wyman did not suffer the damages alleged and therefore cannot prove them.

A motion was made by defendants' attorneys at Friday's session of the court to have the case taken out of the hands of the jury on the ground that conspiracy had not been proven by the plaintiff by testimony or evidence. This motion was overruled by Judge Walker on the ground that there was possibly constructive proof of conspiracy in the refusal of a number of Chicago supply houses to sell to the plaintiff Wyman.

Subsequently a number of supply men were put on the stand, some of whom denied that Wyman had ever been refused goods by them and others of whom admitted that while they had declined to sell Wyman goods, their action was the result of their own individual choice and not because of any agreement or understanding between themselves and the Master Plumbers' Association. Since the association controlled eighty-five per cent of the purchasing power of the trade in Chicago they simply deemed it expedient not to involve themselves in a quarrel with the association by selling to outsiders.

In their cross examination of the plaintiff Attorneys Hacker and Healy brought out for the defense, that, whereas plaintiff had alleged inability to secure goods as the cause of his failure, his books show that he had secured in the twenty months during which he continued in business after the refusal of Wolff and Raymond to sell to him, upward of $31,000 worth of merchandise, whereas his total purchases for the preceding year had amounted to less than $5,000, and that he had left the retail and gone into the wholesale trade shortly after the date of his leaving the association.

In presenting the case to the jury in his final argument Attorney Hacker for the defense presented the argument that as a man has a lawful right to confine his purchases to those who conform to his ideas of trade protection, so a number of men have the right to combine to secure any conditions which they desire, provided they do not resort to unlawful means to secure the desired end. In other words, what one man may lawfully do a number of persons may lawfully combine with him to do. The fact of combination is wholly immaterial.

Arguing along these lines he urged the innocence of the Master Plumbers' Association of any conspiracy to harm the plaintiff; summing up the testimony of the witnesses for the defense to disprove the participation of the defendant supply houses in the alleged conspiracy.

Attorney Douthart in his closing charge to the jury made an impassioned appeal for his client, drawing a vivid word picture of the wrongs which he claimed to have been inflicted on Wyman by the operation of the alleged blacklist.

The rock on which the jury is said to have split was the question of proof as to the alleged agreement between the Master Plumbers' Association and the supply interests. The evidence introduced on this score was certainly weak, while the contradictory testimony of the managers of the various supply houses was most emphatic.

Another thing which weakened Wyman's case was the testimony of several non-association plumbers who testified that they were in the plumbing business at the time of his trouble and had never had any difficulty in securing plenty of goods to carry on their business.

DETROIT

BY MAJOR E. P. BANCROFT.

CREDITORS OF THE MARSH VALVE CO. MEET.

At a meeting of the creditors of the Marsh Valve Company, of Detroit, Mich., held at its office, Oct. 8, 1903, John B. Fadburg was chosen chairman and Wade Millis secretary. Mr. Wilson, the trustee, read a statement of the condition of the company at that date, showing that since his appointment partly finished goods had been finished and stock on hand worked up and all sold, thereby increasing the value of the assets greatly. After considerable discussion by the creditors present a committee, consisting of John D. Fadburg, of the Ideal Foundry Co., John D. Dietz, of the Capitol Brass Works, and E. P. Bancroft, representing DOMESTIC ENGINEERING, were appointed to advise with the trustee as to the best disposition to be made of the plant in the interests of the creditors, to report to the creditors at an adjourned meeting, Oct. 22, unless sooner called together by the committee. There seems to be a reasonable prospect that the company will weather the storm.

AMONG THE MANUFACTURERS.

Mr. Taylor, of the Taylor Manufacturing Company, of this city, who has been confined to his bed at Harper Hospital for several weeks with a severe attack of pneumonia, is so far on the way to recovery as to take gentle exercise. His many friends will be glad to see his genial smile again at his place of business.

W. A. Russell has been appointed manager of the Detroit Stamped Ware Co., and will take charge immediately. Mr. Russell was formerly manager of the Michigan Brass and Iron Works.

G. B. Essex, of this city, has invented, and the company of which he is the head are manufacturing, an automatic multifeed oiler for automobiles. It is strictly automatic, and starts and stops with the engine, the only care required being to keep the reservoir supplied with oil. With the old style of oiler the operator was compelled to turn the oil on or off by hand. If he forgot to turn it off when he stopped, the dripping oil made a bad mess, or if he neglected to turn it on when starting, his engine was soon ruined. The automatic never forgets.

The American Brazing Company have acquired the rights for Michigan of the new German invention called the "Pick, or Ferrofix Process" for brazing cast iron or steel. By this process any casting can be made as good as new cheaply and quickly, instead of consigning it to the junk pile and incurring the expense and delay of sending to the foundry for a new one. A large gear wheel is shown which had been fractured in fifteen places, which was brazed and quickly returned to service as good as new.

AMONG THE PLUMBERS.

J. C. Chalmers, of 405 Merrick avenue, is doing the plumbing of a dwelling for William Hawes, corner Brooklyn avenue and Merrick street.

E. F. Thompson, of 1117 Third avenue, is plumbing a residence for William Colwell on Lewis avenue.

F. A. Shefferley, of 1364 Woodward avenue, has the contract for plumbing a residence for Mrs. R. N. Stock, at 168 Stanley avenue.

J. M. McKerchey Co., of 1153 Michigan avenue, has secured the contract for plumbing a dwelling for T. J. Hurley, at 17 Maybury avenue.

Ralph P. Peckham, of 134 Stanton avenue, is plumbing a residence for Mr. Probst on Atkinson avenue.

Norris & Miller, of No. 254 Randolph street, have been awarded the contract for the plumbing and heating of a residence for E. A. Schroeter, at corner of McDougal and St. Joseph streets.

Pfromm & Warren, of 1193 Michigan avenue, have the contract for plumbing a dwelling for August Ganeradt at the corner of Twenty-eighth and Jackson streets. Also one for Louis Jaenischen at 120 Erskine street.

C. A. Stickels, of 490 Lawton avenue, is plumbing a dwelling for E. A. Stricker, corner Blaine and Second streets.

William Greenley, Jr., 1475 Jefferson avenue, is doing the plumbing of a residence for H. W. Hett on Pennsylvania avenue.

O. H. Helm, of 632 Monroe avenue, is plumbing a residence for Mr. Burre, corner of Agnes and St. Paul streets.

C. P. Tietze, of 558 Mack avenue, is doing a large job of plumbing for Cameron & Currie Co., on Lawton avenue.

George J. Joly, of 607 Dix avenue, has the contract of plumbing a dwelling for Mr. Goldsmith, on Belvidere avenue.

A WONDERFUL RECORD.

Mention has several times been made in these columns of the good work being done by the Detroit Employers' Association, and their methods are being copied by similar bodies all over the country. But it is not generally known that there has not been a single case of differences with employes brought before them in the regular way since the first of last January which has not been settled harmoniously and to the satisfaction of all parties concerned. The gentlemanly manner in which their committees have met committees of workmen, and the calm, just and manly way in which they have discussed with them all debatable questions, has inspired the respect of unions and given the lie to the false teachings of the walking delegate and the agitator.

The association has gone about its business in a quiet, business-like manner, without flourish of trumpets or self-assertion and in less than a year has accomplished a vast amount of good for themselves, their employes and the city.

It has been noted generally that this city has suffered the least of any from labor troubles this season, and this fact is mainly due to the admirable work of this association. One instance may be mentioned which well illustrates the confidence felt in the fairness and justness of the association by at least one labor union.

It is well known that the molders' unions all over the country have been for a long time asking for a nine-hour day. The national organization referred the question so far as this city was concerned to the local union for settlement. Committees from the local union and employers' association met in July, when the employers explained that from the nature of their work none were working on an average the full ten hours, and but few much over nine, but they offered to continue the existing scale for another year. The local union declined this offer and appealed to the national organization, which again referred the question back to the local union for settlement In September the same committees met as in July. The employers frankly informed the union that the conditions of the trade had so changed since July that a reduction in wages would be almost certain in the near future and that they could not renew their former offer. They promised, however, to continue their present relations as long as they possibly could, and if a reduction should become necessary, would give their employes thirty days' notice thereof.

This proposition was reported to the local union and a few days afterward was

accepted, thus showing that they placed confidence in the good faith and fairness of their employers, when they promised to pay all the conditions of business would allow.

One question the employers have from the first utterly refused to discuss; that is whether a man belongs to a union or not, and their absolute right to hire or discharge whom they pleased. Thus Detroit is now known as an "open shop town," and one in which the non-union man will be protected in his right to labor, at all hazards, and by every means at the command of this powerful organization.

MIDDLE STATES

Receives Patent Papers.

Frederick J. Humphrey, of Kalamazoo, Mich., has just received patent papers on the water motor which was invented by him a short time ago.

McHenry Plumber Killed.

Chris Schmidt, a plumber of McHenry, Ill., was almost instantly killed Thursday, Oct. 8, at the residence of former Senator F. K. Granger, by an explosion of gas. His helper, John Leicken, was seriously injured, but will recover.

Change in Plumbing Supply Firm.

Chas. N. Marcellus, of the Ferguson-Marcellus Company, Limited, 19-21 South Ottawa street, Grand Rapids, Mich., has retired from membership in this company. The business will be conducted as heretofore by the remaining members of the firm.

Busy With Heating Work.

The Cleveland Steam Fitting and Supply Company, of Cleveland, O., has been awarded the contract for installing a hot water heating system in the residence of Dr. J. E. Cook, on Russell avenue. They also have the contract for a heating plant for the residence of N. S. Keller, on Euclid avenue, corner Stranwood street.

A Public Spirited Manufacturer.

F. E. Cudell, of Cleveland, Ohio, has prepared a pamphlet, suitably illustrated, addressed to the authorities, the press and the citizens of Cleveland, urging that the grouping of the public buildings be arranged more artistically than is now proposed by the supervising architects, and presenting a suggestion, which he believes would be a vast improvement over the plans presented.

Plant Approaching Completion.

The $60,000 plant of the Columbia Pottery & Manufacturing Company, Kokomo, Ind., is fast approaching completion. The company was organized in May last and the work of pushing construction and installing machinery has been carried forward with gratifying rapidity. The company has now settled down to the work of production and will soon be putting a full line on the market. Thus another important manufacturing industry has taken its place in the rapidly growing number of sanitary manufacturers in the West.

GREAT NORTHWEST

Keep Quite Busy.

McAllester & Pooler, who recently bought out Edward Frank, of Oshkosh, Wis., are quite busy in their new location at 10 Division street.

La Crosse Plumbers Busy.

Jas. A. Trane Plumbing Co., of La Crosse, Wis., have been awarded the contract for heating in the new Park store.

Thill & Lahitz, of La Crosse, have been awarded the contract for plumbing in the new Park store.

Burglars Visit Minneapolis Plumber.

Safe-crackers entered the plumbing shop of J. H. McGuire, 1417 Fourth street, southeast, Minneapolis, Minn., one night last week, and broke open the safe, from which was stolen $2 in change. Entrance to the shop was gained by prying open the back door, and the safe was opened by knocking off the lock and prying the door upon with a crowbar. The work was evidently done by unskilled workmen, as the safe door showed the results of clumsy work.

Only the day before Mr. McGuire deposited $300 in the bank, which he had heretofore kept in the safe.

St. Paul Strike Spreads.

The promised sympathetic strike of plumbers at Minneapolis, Minn., has materialized. About thirty men went out. This indicates that the St. Paul plumbers' strike which has been on for two months has extended to Minneapolis.

Local firms are involved, according to report, because they are reputed to be branches of the St. Paul firms, and not because the plumbers here are making demands.

Men who have been watching the strike fear that all Minneapolis plumbers are to be involved eventually, but say that the fight is to be finished in St. Paul first. If the employes win there, the battleground will be transferred to Minneapolis.

At the same time the St. Paul strike was declared the plumbers were getting $4 a day for eight hours' work. The demand which brought about the strike was for $4.50 a day and half a day Saturday. The Minneapolis plumbers get $4 a day at present for six days' work, eight hours a day.

St. Paul's New Plumbing Inspector a Union Man.

Martin Conroy was appointed plumbing inspector at St. Paul, Minn., on October 1 by City Engineer Rundlett, and he began his duties at once. Mr. Conroy was indorsed for the place by the union plumbers.

Mr. Rundlett says that he had waited a month for the employing plumbers and the union men to unite on a candidate, and that he did not think it advisable to wait longer. He said he had determined to appoint the man that seemed best suited for the position.

Conroy was formerly a journeyman plumber. He was one of several candidates that desired the appointment of plumbing inspector.

Mr. Rundlett stated some time ago that the plumbing inspector must be satisfied with the salary allowed by the city. During the time the office has been vacant the inspections have been made by the city engineer or the assistant building inspector.

Judge Holds Plumbers' License Law Valid.

Judge Kelly, of St. Paul, Minn., in a decision handed down in the district court recently in the Paul Chapel case, holds that the law requiring a plumber to have a state license is not class legislation, and Chapel was remanded back to the care of the sheriff, the writ of habeas corpus made out being vacated by Judge Kelly's order.

Since the plumbers went out on a strike some months ago a number of workmen have been imported from outside the state. The striking plumbers contended that these men had no right to work within the state in cities having more than 10,000 population, as the law required a license or certificate in such cases. In order to make a test of this section of the law, Chapel, a plumber, who was working without a license, was arrested, charged with violating the law.

In the municipal court he was found guilty and was confined in the county jail, where he remained until a writ of habeas corpus was made out by his attorney, who contended that the law only provided for certain cities and was therefore class legislation.

This contention is denied by Judge Kelly, who vacates the writ of habeas and sends Chapel back to the custody of the sheriff.

In his memorandum of the case, which is one of much importance, Judge Kelly says:

"The relator is under arrest, charged with working as a plumber without the required permit. Under this writ he challenges the validity of this law, claiming it is obnoxious to that portion of the state constitution forbidding special legislation. Many objections are made, but they are not well taken.

"It requires no argument to show that the plumbing business, having so much to do with the sanitation of cities or the general health, is a legitimate subject of legislative regulation under the police power of the state.

"Common experience satisfies us that the necessity for such regulations increases with the increase of population and the introduction of sewer systems and water works. Having these simple things in mind, it is readily seen that a classification based on population is the only natural and reasonable one to be adopted. Of course, it may be said that if such legislation be necessary in a city with 10,000 population it is also necessary where the population is less by 100, or 500, or 1,000. The ready answer is that the legislature has to adopt some line of demarcation between urban and rural communities, and having the power, selected this."

American Public Health Association Will Meet in Washington, D. C.

A medical meeting of much public interest will be the thirty-first annual session of the American Public Health Association, which is to be held at Washington, D. C., from Oct. 26 to Oct. 30. This association represents the health authorities in the United States, Canada, Cuba and Mexico.

The Improved "Triumph" Water Lift.

The Improved "Triumph" Water Lift is the simplest constructed water lift in existence. It will last longer and require less attention and repair than any other and it will give perfect satisfaction if correctly installed. It is sold at a price lower than any other good water lift to introduce it into every section of the country where lifts are used.

The sales of the Improved "Triumph" water lift during the six months ending June 30, 1903, have been greatly in excess of the same period in any former year; in fact, some months in that period have shown an increase of nearly 200 per cent over the corresponding months of last year.

From some of the complimentary letters received the following extracts are taken:

"Please send us another No. 1 'Triumph' water lift. This is the most complete motor we have ever used."—The Thos. Gibson Co., Cincinnati, O.

"I have had one of your lifts in my residence for the past 18 months. It has given me good service, and I have never had any trouble with it, nor has it needed any repairs."—P. J. Freaney, Indianapolis, Ind.

"We have used a great number of your water lifts, and we find them entirely satisfactory."—Saunders & Esswein, Columbus, O.

"We congratulate you on the improvements which you have recently made on your 'Triumph' water lift. It was good before—now it is in a class by itself."—Loos & Reynolds, Columbus, O.

You can order from your jobber, or direct from

The Ohio Pump & Brass Co.

900 OAK STREET. COLUMBUS, O.

The Pacific Coast

JNO. K. ALLEN, President
ELMER CRAWFORD, Gen'l Mgr.

OFFICES
San Francisco, Cal., 230 California St., G. P. Manchester, Fred J. Goble. Tel. M 1042
Los Angeles, Cal., 223 W. Second St., W. D. Curtis. Tel. M 1456
Portland, Ore., McKay Building, Wm. Candlin

SAN FRANCISCO

Have Received Another Agency.

The Globe Engineering Company, of 146 First street, San Francisco, Cal., have been appointed Pacific Coast agents for the Western Kieley Steam Company.

Contract for Gas and Electric Fixtures.

The Roberts Manufacturing Company has secured the contract for supplying the gas and electric fixtures in the newly remodeled four-story building at 510 Montgomery street.

Property Turned Over.

The Pacific Gas Company has deeded all its property to the San Francisco Gas and Electric Company, and in turn have taken stock in the latter. The deal at present valuation amounts to about $3,000,000.

Dissolution of Partnership.

The partnership existing between H. E. and H. L. Mollis, under the name of Mollis Bros., plumbing and gasfitters, at 91 Jackson street, has been dissolved. The entire business is now owned by H. E. Mollis, who will continue in the same location.

Engine Company Incorporated.

The Wunder Engine Company has been incorporated in San Francisco, with a capital stock of $40,000, of which $30,050 has been subscribed. The incorporators are J. S. Ellis and C. A. Briggs, of Berkeley; H. S. Orr and J. C. Kitten, of Alameda, and A. C. Aiken, of San Francisco.

Occupy New Offices.

The Martin Pipe and Foundry Company is now occupying its new offices in the Crossley building at the corner of New Montgomery and Mission streets. The storage rooms are not completed as yet, but work is being rushed to get them ready for the reception of goods some time next month.

Improvements at St. Dunstans.

Paul Bancroft has purchased a lot on Sutter street and an addition will be built to the hotel St. Dunstan, which is on the corner of Sutter street and Van Ness avenue. Plans are under way for the construction of a steam heating plant, an electric light plant and laundry which will be installed in the addition.

Old-Fashioned Ideas.

The Board of Education of San Francisco in a recent meeting decided that the use of a low pressure steam mechanical heating and ventilating plant in school buildings would be a menace to the lives of the little children placed in their care, and decided that the buildings should be heated in the old-fashioned way, by means of stoves.

Contracts for Looney.

J. Looney, of 77 City Hall avenue, has secured two good contracts for plumbing, sewering and gas fitting. One is for the new three-story building being erected by Laura V. Holmes on Golden Gate avenue near Broderick street, at a cost of $1,150. The other contract is for the adjoining residence on Golden Gate avenue, and will amount to $1,150.

To Manufacture Gas and Oil Burners.

A simple burner has just been patented, by means of which gas or oil can be economically used in the kitchen stove or range without material alterations to them. The device can also be adapted for heating purposes. The burner is being introduced on the Coast by C. M. Rowley. Arrangements for their manufacture on an extensive scale in this city are being made.

Some Nice Contracts Awarded.

James E. Britt has secured the plumbing, gas fitting and sewering contract on the three-story building being erected by H. E. Corbett on O'Farrell and Steiner streets. The contract is valued at $1,568.

John Gomersal has been awarded the sewering, gas fitting and plumbing contract for the new four-story building on Ellis and Leavenworth streets, owned by Mary C. Fallon, on his bid of $12,945.

Action Shelved.

The action brought against the Sanitary Compressed Air and Suction Dust Removing Company, of 421 Market street, has been shelved. It was claimed that their portable outfit operating on the street was a nuisance to safety, but it is unlikely that anything will be done, as the apparatus seems to conform with all requirements of law and to be no more dangerous than an automobile, which is allowed the use of the streets.

Another New Man.

J. G. Grannis & Co., 565 Mission street, have just added another Eastern man to their already large and efficient staff of engineers. Charles L. Froeding, of Chicago, an expert in sheet metal work, and especially well versed in the fan system of ventilation and heating, has taken a position with them and is now engaged in his duties. He has just been sent by the firm to inspect the High School building at Stockton, in which they are to install heating and ventilating apparatus, and to start operations. The firm also reports that the rough work is now being done on the contract for heating and ventilating the new First National Bank building at Modesto, Cal.

Sewer System, Baths, Etc.

Major General McArthur, commanding the Department of California, is preparing to make some extensive improvements at the Presidio. The more urgent improvements will be attended to at once, such as the sewer system, which will be supplanted by a complete system for the entire contonment, with a 10-inch main to connect with the Lombard street main. Additions are to be made to the officers' quarters, including the installing of new bath houses, and ten additional baths are to be added for each battalion, besides doubling the bathing facilities for the enlisted men. The plumbing and all other work connected with the improvements will be modern and first class in every respect. The cost of these improvements is placed at $50,000.

Bonds Voted.

At a special election held in San Francisco, Tuesday, September 29, ten of the twelve bond propositions put before the people were carried. It is proposed to issue bonds for $1,000,000 to build a much needed new city and county hospital, $7,250,000 for a new sewerage system, $3,595,000 for new school houses and playgrounds, $1,621,000 for improving and repairing public streets, $697,000 for a new county jail and additions to the Hall of Justice, $1,647,000 for a public library building and necessary site, $741,000 for children's playgrounds, $330,000 for acquiring land and building a driveway to connect Golden Gate Park and the Presidio, $597,000 for acquiring land for a park on Telegraph Hill and $293,000 to be expended in purchasing lands for Mission Park. These bond issues mean much for the future of San Francisco, now growing at such a rapid rate. Many of them, such as the proposition for erecting a new hospital and the one for constructing a new sewer system are most timely.

When the work is completed San Francisco will be one of the best fitted cities, in a sanitary respect, in the United States.

Trade Outlook.

The plumbing trade is in a quiet condition and gives promise of continuing so for some time. The rainy season is fast coming on and as usual will put a damper upon active operations. The high wages now demanded by all branches of the building trades is making its effect felt in various ways. Architects report that but few calls are being made for plans for large apartment houses or office buildings. This does not necessarily mean that new buildings are not needed or that they would not be built under different conditions. On the other hand, there are numerous owners who are simply waiting to begin active construction work until the cost of doing such work is reduced from its present inflated figures. Not only is a reasonable reduction in wages expected soon, but also a drop in the price of building material, especially lumber. The improvements planned for the city and voted on at the recent election will necessitate a great amount of work and the expenditure of over $17,000,000. However, it may be a year before operations can be commenced. A suit is expected to test the validity of the bonds voted and then plans and specifications must be prepared.

LOS ANGELES

Pumping Plant Burned.

Fire has completely destroyed the pumping plant of the Union Consolidated Oil Company on Bluff street, north of Ocean View. The damage is placed at $2,000.

Leonard & Wade in San Diego.

Leonard & Wade, of Los Angeles, are preparing to enter the San Diego trade. They will put in bids on the work of constructing extensions to the San Diego water and sewer systems. Plans and specifications for the sewer system are now ready and the water specifications will be complete within a few days.

Sub-Contracts for Hellman Building.

Blumve & Jay report a good volume of business on hand. They have just secured the contract for the steam heating and other pipe work for the new Hermann W. Hellman block, at Fourth and Spring street. The contract amounts to $16,975. Other contracts let on this building this week were as follows: To Charles W. Moore & Co., boiler and oil burning plant, $7,600, and to the Western Cornice Company, sheet metal work, skylights, etc., for $3,316.

Improvements for Park Water System.

Superintendent of Parks Louis Le Grande has presented to the park commissioners a report on the estimated needs in the matter of pipe extensions in the city parks. His estimates are as follows: For Westlake Park, $993.10; East Lake Park, $2,437; Hollenbeck Park, $802.13; Elysian Park, $1,540, and South Park, $966.

Watching Santa Barbara.

The local trade is keenly interested in the latest developments in the Santa Barbara strike. The Boeseke-Dawe Company, a plumbing firm in Santa Barbara, which had

several large contracts on hand, has come to terms with its men. The Ott Hardware Company, which was the firm against which the union plumbers had a special grievance, still stands by the Citizens' Alliance and has refused to accede to the union demands. The company claims to have secured sufficient non-union help to enable it to handle all of its work.

CALIFORNIA

To Purchase Water Meters.

At a meeting of the trustees of Vallejo, which was held recently, the sum of $5,000 was set aside for the purchase of additional water meters.

Water Works News.

James McNair, of San Bernardino, has been awarded the contract for constructing a water works system in that place. The contract price is $8,282.

Doing School Work.

J. L. Wood and John Schirch have secured the contract for overhauling and remodeling the plumbing work in the Colma Public School building in South San Francisco.

Capture a Gold Medal.

The Deasy Hot Water Heater, manufactured by the Deasy Company in Oakland, Cal., was awarded a gold medal at the California State Fair which has just been held at Sacramento, Cal.

Asks for Gas Franchise.

A petition has been presented to the trustees of Ventura by E. P. Foster, for the laying of gas pipe lines and mains throughout the city. Final action will be taken on the matter at the trustees' next meeting.

New Gas Construction Company.

Articles of incorporation have been filed by the United Gas Construction Company at Santa Cruz, with a capital stock of $1,000,000. The incorporators of the new company are J. G. Whitson, P. L. Benjames and T. M. Thompson.

A $3,000 Gas Plant.

W. F. Boardman, president of the San Luis Gas & Electric Light Company, is preparing to start work on the new gas and electric light plant which is to be erected in the southern part of San Louis Obispo. The plant will cost $3,000.

Securing Estimates for Water Plant.

A plan is on foot in Bishop for the erection of a complete water works system and the town clerk has been instructed to write to J. D. Lippincott, of the Government Survey force, relative to the estimated cost of installing such a system.

Pipe Making Plant.

A large pipe making plant is about to be constructed at San Bernardino, in the northern part of the town, in the Mount Vernon district. The firm which recently secured the contract for providing pipe for the water works system to be established in this city is at the back of the new enterprise. The water system will require about 18 miles of pipe.

To Test Sanitary Law.

Sanitary Inspector Haws, of Berkeley, has sworn to a complaint charging William H. Pennie, a local plumber of that city, with violating one of the municipal building ordinances. The complaint states that Pennie constructed a sink in a residence on Derby street, without first filing plans with the town clerk. The arrest was made for the purpose of testing the new sanitary law which has just gone into effect.

Oakland Plumbing Contracts.

Charles School has secured the plumbing contract for the new residence being erected by George Scott on Edward street, near Telegraph avenue.

B. F. Underwood has secured the plumbing contract on the two-story residence being erected on Maura street near Derby.

J. B. Cruiz has been awarded the plumbing and gas fitting contract on the new residence of H. K. Wells in Alameda.

Fight Still On.

The long-drawn-out fight is still on in San Diego between the city plumbers on one side and the Board of Health and Plumbing Inspector Walker on the other. The war now threatens to involve the Federated Trades as the combined labor forces of the city have taken sides with the plumbers, and they state that peace will not be restored until the plumbing inspector is appointed. The plumbers have retained a counsel and an ordinance is being drawn up providing that the office of plumbing inspector shall be filled by an experienced plumber.

Water Works and Piping.

The joint water committee of the city council of San Diego has voted to recommend that 18,840 feet of 6-inch pipe be purchased to be laid between Pacific Beach and La Jolla.

The Santa Catalina Island Company, at Avalon, is making preparations for taking care of the sewage at that place. A catch basin is to be constructed and a pumping plant installed.

Engineer Parcell, of Sausalito, has filed his report with the trustees of that town, on the cost of installing a fresh water distributing system, also an estimate of the annual cost of operating the same.

Porterville's Water Works.

Work has commenced on the construction of a water works system in Porterville, for the Porterville Water Works Company. A pump pit will be constructed which will contain two engines of 32 horse power and two pumps with a capacity of 500 gallons a minute, operating against

WATER PRESSURE OPENS AND CLOSES

Nethery Flush Valves

CANNOT BE PROPPED OPEN.

NOISELESS.

[COPY]
BUREAU OF BUILDINGS
No. 220 Fourth Avenue,
The City of New York, Nov. 8, 1902.

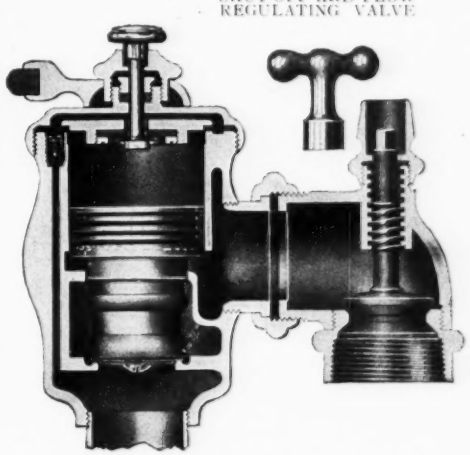
HON. PEREZ M. STEWART, Superintendent of Buildings.

SIR:—I would respectfully report that after a thorough examination and a severe water test of different pressures, I find that the Nethery Hydraulic Valves for Water Closets and Urinals, answers in every respect to all the requirements for proper flushing. It is simple in construction and not liable to get out of order, while all of its parts are easily accessible. I would therefore recommend that it receive the approval of the Bureau of Buildings of the Borough of Manhattan.

Respectfully submitted,
P. J. ANDREWS,
Chief Inspector of Buildings.

Approved November 10, 1902.
(Signed) PEREZ M. STEWART,
Supt. Bureau of Buildings,
Borough of Manhattan.

SHUT-OFF AND FLOW REGULATING VALVE



Under continuous pressure of push-button, piston remains stationary at top of valve chamber, and lower piston ring closes supply opening, making continuous flow impossible.

NETHERY HYDRAULIC VALVE CO.

100 William Street, Room 311, NEW YORK.

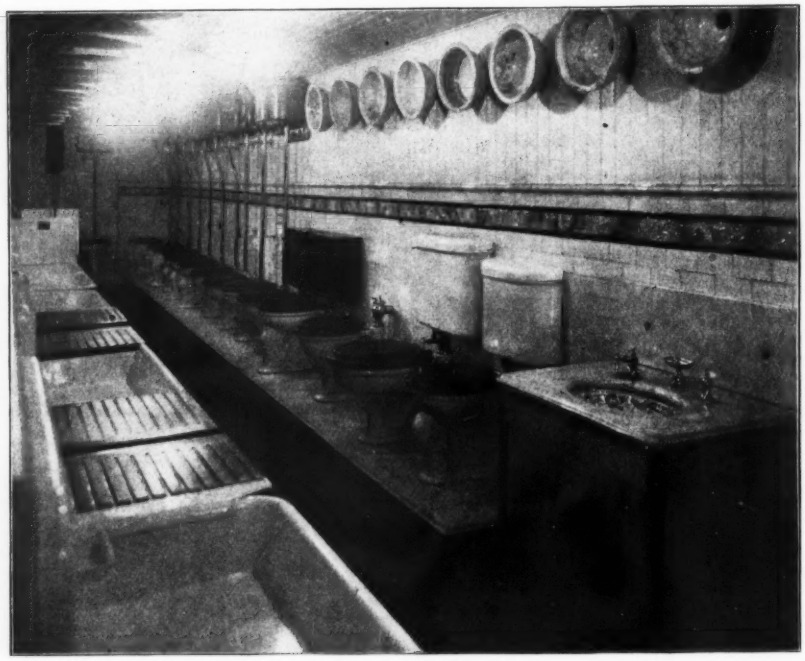
Stevenson Building, INDIANAPOLIS, IND.

a pressure of 100 pounds to the square inch. Work will also commence on the construction of a steel tower of heavy concrete pipes and a tank with a capacity of 100,000 gallons will be erected. There will also be an auxiliary reservoir which will hold 150,000 gallons for fire purposes. Crude oil will be used as fuel for the engines, and this will necessitate the construction of a crude oil tank to hold 7,000 gallons. The engine house will be of corrugated iron and will be built of concrete.

OREGON

Has Enough of Strikes.

John Hannaford has lived in Portland for many years and is thoroughly familiar with the trade. Some years ago Mr. Hannaford was interested in a plumbers' strike to the tune of $50. He was treasurer of the association and got left. After that he started in business for himself and has been his own boss ever since.



Sample Rooms of Crane Company, at San Francisco, Cal.

Contracts to Be Let.

In spite of the approach of winter much building of large size is soon to be under way in Portland. The new Trinity Church, on Nineteenth and Davis streets, is now being figured on and contracts should be let within a few days. It is thought that the building will cost about $90,000. Sub-contracts are also to be let for the A. H. Watts buildings by Parrish & Watkins, the general contractors. A three-story brick hotel is now being prepared for by H. Wenne. The building will cost about $14,000.

Lewis & Clark Fair Work.

The directors of the Lewis & Clark Fair, at Portland, have apportioned $380,000 of the Exposition fund for various work. Among the other items are appropriated about $20,000 for a complete water system, including a water tower, a gridiron system from the tower including fire hydrants, piping for Bull Run water and connections with and piping on the peninsula; about $15,000 for a sewer system in three subdivisions; $9,500 for a pumping plant, including two centrifugal pumps with a combined capacity of 12,000 gallons per minute; a high-service pumping plant of two pumps, with a combined capacity of 900 gallons per minute, and a pumping plant for the sewer system, and about $89,000 for a lighting and power plant.

Portland Plumbers' Strike Ended.

The plumbers' strike, which has been on in Portland for six weeks, was declared off on September 30, when the men returned to work at the old wages, $4.50 per day. The demand for $5 per day was dropped. During the last week or two of the strike the master plumbers, who had turned up their sleeves and gone to work with a will, had a very busy time of it, but they claim to have made more money than for a number of months previous. Plumbing Inspector Hulme states that he had to keep a sharp eye on the employers who had turned workmen, as they were very careful about making an unnecessary use of expensive material. For some days before the strike was formally declared off it was evident that the backbone of it had been broken. Many of the journeymen had already gone to work at the old wages before the official end came.

Better Business Outlook.

The master plumbers of Portland are pleased with their victory. The union is badly beaten and now both union and non-union men can be seen working side by side in harmony on almost any job. Work goes merrily on and will continue to do so if the labor unions do not order more strikes later on and upset things again. The labor troubles in Portland during the past year have put the city back two or three years in its growth, but the trade and the public in general are feeling better now than they have for some time. Much work is in sight and much more is contemplated. Several owners of large buildings are figuring on having old plumbing replaced with new systems and much overhauling has been ordered. Several office buildings are to be changed to rooming houses. The coming year promises great things in the building line. With the labor troubles settled Portland should show some great changes by 1905. For the past two years there has been a short supply of plumbers in this city and for this reason contracting plumbers are sometimes wary about bidding on big jobs, as they are not sure of getting men to do the work. Only this week a master plumber came over from Vancouver to try and get a couple of men, but could not find them.

WASHINGTON

Water Works Construction.

The new water mains at Columbia, Wash., will be extended into the Lakewood addition and it is probable that a four-inch main will be laid.

The council of Spokane has ordered that water mains be laid from Monroe to Mill street and on Pacific avenue from Division to Browne street.

Washington Building.

The contract for the new city hall at Hoquiam has been awarded to C. E. Philbrick for $12,319.

M. Seiler & Co., of Spokane, have plans under way for the construction of a $50,000 business block on Riverside avenue in that city.

A building permit has been issued in Seattle for the construction of a new engine house. The proposed structure will cost $11,894, and will be a combination of brick and wood.

UTAH

Bath Houses and Bathing Pond.

Work has commenced on the construction of the new bathing pond at Lagoon, and plans are completed for the erection of 200 bath houses, which will be completed before the opening of the summer season next year. Simon Bamberger, president of the Salt Lake & Ogden road, is interested in the enterprise.

Receiving Bids for County Work.

The County Commissioners of Weber County are receiving bids at the office of the County Clerk for the erection of a two-story addition to the County Infirmary building at Roy, in accordance with the plans and specifications now on file with the clerk. The contract includes a heating and ventilating system and the plumbing work.

IDAHO

Masonic Temple at Lewiston.

Plans and specifications have been accepted for the construction of the new Masonic Temple and Opera House at Lewiston, which will cost $50,000.

Water Plant Improvements.

The council of Idaho Falls is contemplating a number of improvements to the city's water plant. About 1,000 feet of new mains will be laid.

MONTANA

Water Plant Bonds.

The council of Helena, Mont., has adopted an ordinance authorizing the issuance of bonds in the sum of $614,000, for the purpose of acquiring a municipal water plant. The city clerk has been authorized to advertise for bids for the construction of the plant.

Dominion of Canada

JNO. K. ALLEN, President
ELMER CRAWFORD, Gen'l. Mgr.

Toronto Office: No. 1 Traders' Bank Building
Representatives, Victor H. Ross, O. M. Ross.

Montreal Office: 39 St. Sacrament St.
Tel. Main 2018
Representative, F. A. Strawsine

TORONTO

Mr. Wright Recovering.

Mr. Joseph Wright, of Bennett & Wright, who has been seriously ill for some time, is, we are glad to say, rapidly recovering.

To Build at Lachine.

It is announced that the Toronto Radiator Company will build new works at Lachine. Over 100 men will be employed at the start.

New Gas Company.

The Acetylene Construction Company has been given permission to do business in Ontario. C. H. Connor, of St. Catharines, has been appointed its attorney.

The Automatic Sprinkler.

The Bain Wagon Works, at Woodstock, are having an extension of the automatic fire-extinguishing apparatus placed in their factories by Purdy, Mansell & Co., of Toronto.

Sues "Soo" Company.

The James Morrison Brass Manufacturing Company has issued a writ against the Tagona Light and Power Company, one of the concerns at the "Soo," for $368 for goods supplied.

In Their New Quarters.

Cullen & Johnson are now occupying their new premises at 53 Colborne street, which they have fitted up in good style. They report business as steady and the demand for brass goods very strong.

Local Jobs.

C. E. Pickard, of Yonge street, is installing hot water heating in Mr. Robertson's house on McCaul Street.

Geo. Wallis, of College street, is working on the hot water plant being installed in Mr. McMurrich's house on Huron street.

Found White Mice.

A curious discovery was made in the residence of Mr. Thomas H. Collier, 32 Lippincott street. Plumbers at work pulled up a floor and discovered a nest of young mice. Two of the little fellows were pure white, while the others were grey. Mr. Collier says no white mice have been kept in his house as pets.

Bennett & Wright.

The Woodstock Baptist College is having its plumbing and heating system thoroughly renovated by Bennett & Wright Co., of Toronto, who are installing three 75 horsepower tubular boilers, made by the John Ingles Co. The Bennett & Wright Co. are also installing the plumbing and heating apparatus in the new G. T. R. station at Dunnville.

Guest & Co.

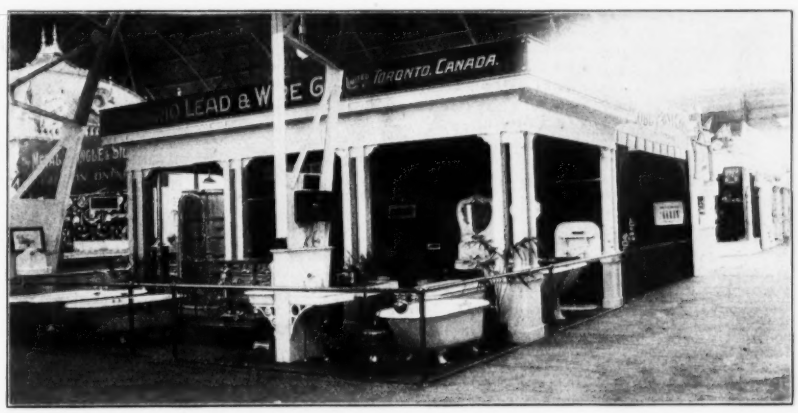
Frankel Bros. are having a steam heating plant installed in their warehouse on George street, by Guest & Co., who also have two houses on Dewson street, for Wm. Brown, and Mr. O'Brien's residence at 444 Wellesley street to fit up with plumbing and gas fixtures. This firm is also fitting up the Chinese laundry at 83 Church street with a modern plumbing system in pursuance of the orders of Health Officer Sheard regarding these establishments.

The John Ritchie Co.

Extensive alterations are being made in the steam heating plant in the factory of the Christie-Brown Company, by the John Ritchie Company. Architect Siddall has awarded to this firm the contract for the plumbing and gas fitting in the new building on Adelaide street West to Jones & Moore, and they are also doing the plumbing in McIntosh's store at 209 Yonge street.

Back on the Job.

Many congratulations were showered on Mr. Thos. Sweetman, bookkeeper for Purdy, Mansell & Co., on his return to work after a four months' vacation in Muskoka. Mr. Sweetman is now restored to his usual health and certainly looks as if he had enjoyed the outing. The hope is general that he will retain his present good spirits. choir. The bride was attended by Miss Street, sister of the groom, and Mr. Baker, of Rice, Lewis & Co., supported Mr. Street.



Ontario Lead & Wire Co's exhibit at the Dominion Fair, recently held at Toronto.

After the ceremony the happy couple left on their bridal trip to Chicago, and on their return will reside on Ontario street.

The Provincial Convention.

The semi-annual convention of the Master Plumbers Steam and Gas Fitters of Ontario was called to order at 10 o'clock on Thursday morning the 15th inst., by President Mansell, with an attendance of about forty members. The delegates at once settled down to business and at the close of the session had succeeded in getting through a large amount of routine work. Owing to the fact that there was no election of officers there was not the usual amount of interest manifested.

The Toronto Association entertained the visitors in the evening at the King Edward Hotel. Plates were laid for forty guests and a most enjoyable time was spent.

This Month's Pictures.

We publish herewith pictures of the excellent exhibits of the James Morrison Company and the Ontario Lead and Wire Company at the Dominion Fair. In the line of plumbers' supplies these firms were away ahead of anything on the grounds.

In the Ontario Lead Company picture may be seen the model of the Quinn automatic flusher, which attracted so much attention; the display of bathroom supplies was exceptionally good, too. The Morrison exhibit was shown in the Machinery Hall and was the finest in the entire building.

The pictures were taken by Galbraith, the Yonge street photographer, and who took the picture of the banquet in McConkey's last winter. Mr. Galbraith has made some 300 different pictures of the fair. The clearness of the cut is due to the excellence of the photo.

Fitting Up Showrooms.

Within the past year there has been a noticeable improvement in the conditions of the majority of plumbing shops in Toronto, and few now are without showrooms that make it a pleasure for customers to enter. The friendly competition between the masters has resulted in great advantage to all concerned. The Bennett & Wright Co. are now engaged in fitting up their store in elegant style, and when completed it will be probably the finest in the city. Two bathrooms are being fitted up with the most modern equipment and present a most tempting appearance.

James Sherlock, of Dundas street, is also remodeling his store. He has taken in the adjoining premises, thus doubling the capacity of the showroom. An archway has been cut between the stores and one-half of the place will be devoted to showing goods, of which Mr. Sherlock has a big stock on hand.

Radiator Company to Move.

A meeting of the directors of the Canada Radiator Company was held recently a Saturday evening. At the meeting it was announced that a new building, being constructed for the company in Montreal, is rapidly nearing completion. The foundations are already completed and about half the brick work is finished. The company will occupy the building next spring.

This means that the Radiator company has definitely decided to move its works from Port Hope to Montreal.

F. J. Travers, manager of the compnay, is at present in Montreal.

It is reported on good authority that another company is anxious to procure the Radiator building in order to establish extensive works in Port Hope. The new company is willing to pledge itself to employ twenty-five men at high wages to commence with, and anticipates large extensions as their business develops.

Program for the Winter.

The Executive Committee of the Master Plumbers' Association, of this city, is endeavoring to arrange for a series of papers on Plumbing, Heating, Ventilation and other kindred subjects, to be read at the bi-

weekly meetings during the winter months. Having been most successful during the past summer in bringing up the physical condition of the members to a very high standard, the gentlemen in charge now propose to give an equal stimulus to the mental capacity of the craft. There are a large number of men in the association capable of presenting a paper that would prove of great interest to their fellow tradesmen if they could be induced to spare the necessary time for its preparation, and there are many more, practical men, who, in the discussion following the reading of the paper, would give some valuable hints that would be useful in everyday work. The scheme is a most excellent one, and will undoubtedly serve to retain the interest of all the members during the long winter.

The Canadian Manufacturers' Association.

Such gatherings as that recently held in Toronto for the promotion of Canadian manufacture can have but one result: that of great good to our country.

"Made in Canada" is now a standard motto, and our manufacturers show the card at every opportunity, and when placed side by side with goods of foreign make, the "Made in Canada" ones are by no means in second place.

It is due to the untiring efforts of the Canadian Manufacturers' Association that the products of Canada have such a world-wide renown, and to the efforts of this association the future of the country will owe a debt of gratitude.

The annual meeting just closed in Toronto was spoken of by the members as being the most successful in the association's history, and the reason for this is assigned to the fact that some manufacturers were not wholly in favor of the association's objects, but even they are now as enthusiastic as can be.

The members to the number of about 150 are now on an extended tour of the western country.

The election of officers resulted as follows: President, Hon. Geo. E. Drummond, Montreal; First Vice President, W. K. George, Toronto; Ontario Vice President, H. Cockshutt, Brantford; Quebec Vice President, Hon. J. J. Rolland, Montreal; Nova Scotia Vice President, D. W. Robb, Halifax; British Columbia Vice President, John Hendry, Vancouver; Manitoba Vice President, E. L. Drury, Winnipeg; N. W. T. Vice President, W. S. Fisher, Calgary; Treasurer, Geo. Booth, Toronto.

German Sewage Specialist.

Mr. Ernest Wattenberg, Government Civil Engineer and architect, of the city of Essen, Germany, who is on a sewage treatment inspection and investigation trip since Aug. 10 last, when he left Germany, arrived here this week.

Mr. Wattenberg says England is about 30 years ahead of Germany as to treatment of sewage. Necessity compelled England to pay attention to this matter sooner than Germany, but of late it has become a burning question in Germany.

The Government has set aside a few million marks for the introduction of the best and cheapest system available.

He is of the opinion that the intermittent filtration system which we are about to introduce will work all right, but from what he has seen so far, particularly in England, he would recommend filtration of the effluent by coal slacks wherever they are plentiful and where land is expensive, as the best and cheapest system. He says he visited a number of places in England where sewage was treated in that manner and found the water ran off as clear as crystal. He has visited a number of places in New York, Massachusetts and Pennsylvania, and expects to return to New York City in about four weeks from now, and from there home. He will likely have his report that he intends to lay before the German Government completed before he leaves for home and will send us a copy of the same.

Among other things Mr. Wattenberg remarked that hotels in smaller cities in the United States and Canada he did not find as good as in Germany. Toronto, he said, was all right; he stopped in a good house there. The clerk asked where he stopped; he said in the King Edward. The clerk replied: "No wonder; I am sure you have no such hotel in all Germany." He said: "I beg your pardon; yes, we have one right in my own city, Essen, fully as good as the King Edward, erected and controlled by the late gun king, Mr. Krupp, but not on such large scale as the King Edward."

James Morrison Brass Mfg. Co's exhibit at the Dominion Fair, recently held at Toronto.

Plumbers' Social Evening.

A most enjoyable time was spent at the rooms of the Master Plumbers, Steam and Gas Fitters' Association on Richmond street on Monday night last, when the representatives of the supply houses were invited to join in testifying to the appreciation in which the City Sanitary Inspector, Mr. William Copping, is held by the trade. There were over one hundred gentlemen present when the meeting was declared open and the visitors invited to enter the sacred precincts of the lodge room. As they marched to the head of the hall, the whole body rose and pronounced them jolly good fellows. As the cigars were passed around, the spirit of good fellowship seemed to increase, and any doubts that may have existed as to the solid basis on which the Toronto Association is founded were very soon dispelled, for the members proved themselves gracious hosts and generous entertainers.

The chief event of the evening was the presentation to Mr. Copping of a solid gold ring, bearing a suitable inscription and with the recipient's initials in raised letters, which President Robert Ross handed to him, with a short speech in which he succeeded in expressing, in his own inimitable style, the kindly feelings which all the members held toward the recipient. Mr. Copping replied with a short speech, saying he had enjoyed the games as much as any one and had not looked for any reward. He was much pleased to see the good feeling that existed and wished a very long and prosperous life to the association. Little talks regarding the relations between the supply men and the trade were given by Messrs. Brewer, Rodgers and Helliwell and Fred Armstrong and Secretary Meredith made neat responses. Songs were contributed by Charles J. Bearis and E. J. Brewer, and many other prominent members were called on for short speeches and stories, among them being Kenneth Allison, George Clapperton, Wm. Mansell, J. H. Wilson, Geo. Cooper, Lewis LeGrow, McKittrick, Robt. Harrison and others. The meeting broke up at an early hour with many expressions of satisfaction and a general desire for more "open" meetings in the future.

Public Baths Are Coming.

The effect of the organized endeavor of the Plumbers' Association for the Extension of Sanitary Science can be seen in the

general interest taken in the subject. The suggestion that bath rooms should be provided for city schools is not new and has been urged at different times by progressive members of the profession in this and other cities. The necessity of a practical system of public baths and swimming tanks has been repeatedly advocated, and it is not surprising that the local Medical Health Officer has taken the matter up. Members of the Association have approached the matter in a public spirited way, and the Medical Health Officer will have the support of the profession in recommendations which he may make along this line.

A letter sent this week to Public School Inspector Hughes by Dr. Sheard, repeating these suggestions, is as follows:

TORONTO, Oct. 9, 1903.

Dear Sir:—I desire to bring before your notice what appears to me to be a pressing sanitary necessity in connection with some of our public schools, that is the providing of a proper number of baths for the use of the school children. I need not urge upon you the importance of personal cleanliness of the school children as a sanitary factor in connection with the schools. I have seen many cases among the scholars of some of the schools of the city where children were in a sad condition of personal uncleanliness, having been compelled to attend school and associate with other children. It is in no way the fault of the child and probably not altogether the fault of the parent, as in many instances facilities for proper bathing were not available. In other instances both parents were compelled to work every day and had not sufficient time nor opportunity to exercise a proper degree of supervision over the family, to the detriment of the individual child, as well as other children who were compelled to associate with him in the school room. I might mention in particular Louisa Street, York Street, Sackville Street and McCaul Schools as examples, although in these schools I can bear testimony to the more than ordinary care exercised by the teaching staff in connection with such matters. The school districts are, however, such as make these schools, in my opinion, those where a properly equipped system of baths would contribute materially to their improved hygienic conditions, as well as to the health, vigor and comfort of the pupils. My desire is to see eight or ten properly equipped first-class baths in connection with each of these schools.

I would also emphasize the necessity for the value of swimming baths for boys, and suggest that swimming baths be constructed as an experiment in connection with the schools mentioned if the buildings have sufficient space to accommodate such without interfering seriously with school work. I feel that a sum of $5,000 or $6,000 spent in this way would be money well spent and yield results in the matter of public health and improved school hygiene highly satisfactory.

Trusting this matter may receive the favorable consideration of the Public School Board as well as yourself, I have the honor to be,

Faithfully yours,

CHARLES SHEARD, M. D.,
Medical Health Officer.

Another view of James Morrison Brass Mfg. Co's. exhibit at the Dominion Fair at Toronto.

ONTARIO

NEW ALARM SYSTEM.

The town of Barrie will install a new electric alarm system and has voted $3,000 for the purpose.

WATERLOO.

Lippert & Co. have the contract for a steam heating plant and the plumbing in a new factory here.

CUT HIS HAND.

While working at the sanding machines at the Boston Wood Rim Co., Norman Tweedie, aged 16, has his left hand badly lacerated. He was taken to the General Hospital for attention, where he remained over night.

ST. THOMAS.

The city council has referred the matter of a plumbing by-law to a committee, composed of the Chairman of the Board of Health, the city solicitor, sanitary inspector and city engineer, which will report at the next meeting.

BOWMANVILLE.

A hot water heating system is being installed in the residence of Mr. Williams, by W. H. Duston, of this town.

WOODSTOCK.

The contract for the heating and sanitary work in the hospital here has been let to Bennett & Wright, of Toronto.

PORT ARTHUR.

Marks, Clavett & Dohie, of Port Arthur, are the successful tender for the work of heating the new Meikle warehouse.

BRANTFORD.

Taylor & Crouche are looking after the plumbing and heating of Mr. A. Whitaker's house here.

The Jefferson Union and Flange

Have no equal for high or low pressures. They are the product of carefully selected metal and skillful workmanship. They save trouble and money. Once used, always used.

ASK YOUR JOBBER FOR THEM.

JEFFERSON MANUFACTURING COMPANY, LEXINGTON, MASS.

Western Selling Agents: James B. Clow & Sons, 358 Franklin Street, Chicago

Wm. Tipper & Sons are putting in a hot water heating system in the Brantford Club House.

COLLINGWOOD.

McFadgen & McQuade are doing the plumbing and placing a hot-water heating plant in Mr. Copeland's residence.

BARRIE.

The by-laws to provide $3,000 for improvements to the fire hall, install an electric alarm system and build a lockup and $120,000 to establish a carriage factory were carried by large majorities on the 28th ult. Work will be commenced at once.

WINDSOR.

M. B. Squires is at work on a heating contract in Mrs. Pond's house.

The City Council have passed a by-lay to repair the Central School Bulding and use it for a City Hall, and the proposition will be submitted to the ratepayers on Oct. 18. The changes in the building will cost $13,000.

KINGSTON.

The contract for installing the heating plant in the Catholic Church at Cushendall has been awarded to Lemmon, Claxton & Lawrence, of this city.

The contract for installing hot water heating apparatus in the Nurses' Home at the Rockwood Asylum here has been awarded to Elliott Bros.

STRATFORD.

Stratford's new armory, to cost $10,000, is provided for in the supplementary estimates brought down in the House of Commons the other day. Woodstock is to have a similar sum for an armory. St. Mary's is to have a much needed new postoffice, the sum of $8,000 being set aside for public buildings there. Wingham gets an equal grant for the same purpose.

HAMILTON.

Jas. H. Stewart has in hand the plumbing and heating of the Traders' Bank Building.

The Jenckes Machine Company, of Sherbrooke, Quebec, manufacturing hoisting and rock crushing machinery, etc., is looking for a suitable site on which to move. Another machinery company, which will employ 400 hands and require about four hundred horse power, has decided to locate here. The name of the concern is not divulged, as several towns are after the factory.

SARNIA.

W. J. Barrie, Sarnia, is putting in a steam heating plant in the Arlington Hotel.

The contract for the electric wiring of the new postoffice has been awarded to Robert Ross. The contract price is approximately $700.

The following contracts have been awarded on the brick residence being erected by D. Milne, on the corner of Vidal street and London road: Geo. Proctor, carpenter work; R. Simpson & Co., painting; R. Ross, plumbing. The house is to be two-story brick, with gray sand-brick veneer, stone foundation and slate roof. It will be offered for rent.

LONDON.

It is probable that there will after all be a separate heating plant for the new Nurses' Home. It was at first the intention to have the home heated by connecting with the big boilers in the hospital proper, but the engineers have reported that this would mean a great strain on the plant, and that it would require a large amount of fuel to keep up the pressure required. Accordingly the proposal now is to have a separate plant for the home, the furnaces being fed with hard coal, which will not require more attention than one man can conveniently give them in connection with his other duties about the place. The difference in the cost will be something like five hundred dollars.

OTTAWA.

McKinley & Northwood are installing a hot water heating plant in Mr. E. P. Staunton's house; also in the residence of Mr. Darcy Scott here.

A large business block is being erected at the corner of Dalhousie and Murray streets. It is to be two stories high, 48 feet wide, and 90 feet long, and will have cellar full size of building. Messrs. J. & T. Gagnon are the owners. The work is being done by day labor. The entire building is to be used as a departmental store, and will be occupied by Mr. Malette, who is now in business at the corner of Dalhousie and St. Patrick streets. The building is expected to be finished by the 1st of January, 1904.

MONTREAL

DOING CHEMICAL LEAD WORK.

E. C. Mount & Co., of 4278 St. Catherine street, are doing the chemical lead work in the new plant of the Riordon Paper Mills Co., at Hawksbury, P. Q.

HEATING AND PLUMBING NEW BANK.

The Ogilvie Bros., of 249 Bleury street, are doing the plumbing and steam heating in the new Imperial Bank being constructed on St. James street, Victoria square.

ALIVE IN THE MARENTINE PROVIDENCES.

Hector M. MacKenzie, 745 Craig street, who recently spent several weeks visiting the trade in the Marentine Providences, has returned. He reports business in the east unusually brisk this fall.

ONE PIPE SYSTEM.

J. W. Hughes, of 2 St. Antoine street, is installing a one-pipe system in the building on the corner of McGill and St. Paul streets, belonging to the estate MacFarlane. He is also doing the plumbing and steam heating in the large new factory being constructed on Beaver Hall Hill for the Stonewall Jackson Cigar Co.

WILL COME TO MONTREAL.

The new buildings under process of construction in this city for the Canada Radiator Co. are rapidly nearing completion. The foundations are already completed and about half of the brick work is finished. It is expected that early in the spring the company's works will be moved from Port Hope, where they are at present located, to Montreal.

MORE CONTRACTS.

W. J. Graham, 85 Cathcart street, has the contract for the steam heating to be done in the new addition being erected to the Queens Hotel, corner Windsor and St. James streets. He also has the contract for the installation of both the heating and plumbing in the large new six-story building being built on the corner of University and St. Catherine streets, for R. M. Renouf.

Mr. Graham is about to commence operations on the heating and plumbing systems in the fine new residences of John Quinlen, Westmount, and A. C. Mathews, also of Westmount.

AWARDED FINE CONTRACTS.

Alexander MacKay, Victoria square, has been awarded the contract for the heating and plumbing in the new residence being constructed on Grosvenor avenue, Westmount, for Dr. Burges.

Among several other contracts, Mr. MacKay has on hand, is one for the installation of a steam heating system in the factories of the Oze Co., Ltd., corner of Mt. Royal and Drolet streets, Montreal.

The system will require between fifteen and sixteen thousand feet of pipe, and be in every detail of construction an excellent example of modern engineering practice as applied to steam heating.

LABOR CONDITIONS.

The strike of the builders' laborers appears to remain in about the same condition. There are all told between 60 and 70 men out of employment at present. Mr. T. R. Martin, the business agent of the union, states that there is no intention on the part of the men to give up the fight for their demands, and the other trades are willing to come to their assistance. Mr. Martin is confident of the issue, and is of the opinion that the strike is about to assume a serious stage. But, on the other hand, the contractors do not appear to have the slightest fear of the outcome. They have all the men they desire and building operations throughout the city are not being delayed in the slightest by the action of the strikers.

In the event of the other trades coming to their assistance a settlement of the trouble may be somewhat delayed.

ACCOUNT SETTLED.

A report which will be submitted at the next meeting of the parks and ferries committee, evidently proves that ex-Ald. Lamarche, who was given the contract for plumbing to be done on the mountain, has not made excessive charges for the work. The account submitted by Mr. Lamarche was for $1,076.40. Certain members of the committee held the bill was far too high. Outside experts were appointed to examine the work and report. The two experts were W. Hughs and Jos. Thibeault. As the estimates of these two differed somewhat a third sanitary engineer, Mr. P. H. Stevenson, was also appointed. The result of the conference is that a report has been drafted to the parks and ferries committee, showing that $1,040.13 worth of work was done on the mountain. This practically agrees with the original amount demanded by ex-Ald. Lamarche.

WINNIPEG

AMONG THE PLUMBERS.

One of the busiest firms in this busy town is Cotter Brothers, who have a number of large jobs on hand. Among them are the heating and plumbing of Greenshield's new warehouse, the heating and plumbing of the Carnegie library, the Manitoba Government Land Titles office, and the Winnipeg General Hospital. Cotter Bros. are also remodeling the heating plant of the Merchants' Bank building by the addition of a steam system. They also have a large job at Boersevain, Manitoba.

The Dominion Steam Heating Company is installing a steam heating plant in the Dyson factory. The same company is doing the plumbing and heating work in the Fortune Block and in St. Augustine church.

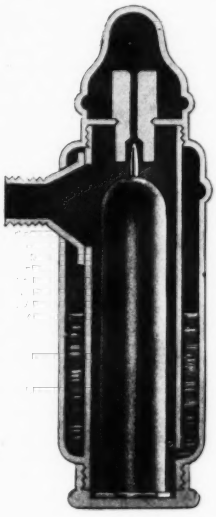
The Standard Plumbing Company has contracted for the heating of the Regina Trading Company's fine new building at Regina. They have also contracts for the plumbing and heating of the Stobart Block and the Criterion Hotel.

Green & Lister have a large number of contracts for work in private residences, and in fact have if anything more work than they can do. The heating and plumbing in the new residences being built by Messrs McArthur, Young, Archibald, Hutton and Verhouven are being done by this firm.

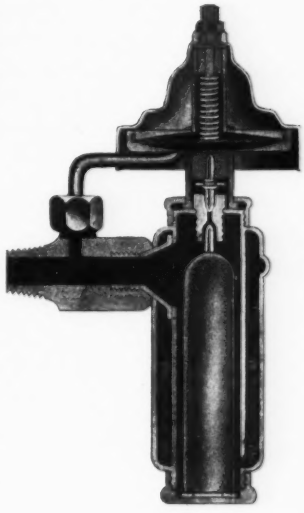
Charles Orr & Company, of this city, have the heating and plumbing contract for the Thompson Block, and a large amount of other work.

Charles Gate & Son will have the contract for Foley, Locke and Larson's great warehouse. It is a big contract. The same firm will do all the work in the Palace Hotel.

The Forehanded Four



You will surely be forehanded if you use the "Allen" Specialties. They will secure new work for you and assist you in improving old work. They will make every customer a walking "Ad" for you.



The "Allen" Automatic Air Valve.

Is absolutely Automatic. Requires no adjustment at any time, freely vents the radiator of all air. No cold loops when the "Allen" is used.

Automatically closes the instant steam reaches the valve.

A sample valve free for the asking.

The "Allen" Automatic Air Valve with Vacuum Attachment.

Automatically vents all the air from the radiator or system, closing instantly steam reaches the valve. Also automatically prevents the ingress of air into the radiator or system through the air valve when steam goes off.

A saving of 25 to 40 per cent. in fuel can be had by use of this valve on any job (old or new) of low pressure steam heating.

In exhaust steam heating back pressure entirely removed from engines by use of the "Allen" Automatic Air and Vacuum Valve. A complete treatise on Vacuum Heating free for the asking.

EQUIP OLD JOBS WITH "ALLEN" VALVES

BIG PROFITS FOR THE DEALER BIG RESULTS FOR THE USER

The "Allen" Thermostat or Heat Controller.

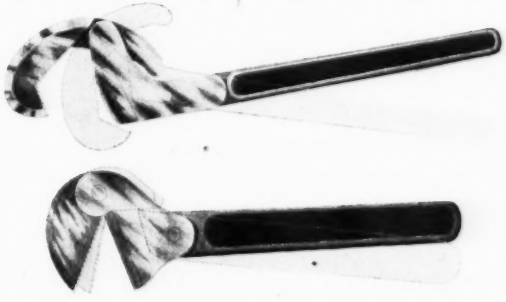
Automatically controls the drafts of the heating apparatus by the temperature of any one room in the house. It is absolutely perfect in its mechanism and operation, controlling the drafts of the heater within the range of one degree. So simple that the merest novice can properly install the same.

Satisfaction guaranteed.

SENT ON TRIAL.

Send for descriptive circular.

No Shop is Complete without the "Allen" Automatic Pipe Wrench.



It instantly and automatically adjusts itself to and grips seven sizes of pipe. It instantly and automatically unlocks when pressure is removed. It will stand all kind of rough usage because its wearing parts are made of the best tool steel. It can be worked with one hand as easily as with two. It has a removable jaw which can be easily replaced or resharpened. Costs no more than the ordinary wrench, and will be sent on 30 days' trial to be paid for if satisfactory. As a time saver it will pay for itself in one week

THE "ALLEN" GUARANTEE MEANS SATISFACTION TO THE USER OR NO PAY

Norwall Manufacturing Company

40 Dearborn Street, Chicago, Illinois

P. J. Glennon, Seattle, has an additional contract for the Butler Hotel, using ten of Cooper's closets, twenty-five of Cooper's bath fixtures, and thirty-six of Cooper's lavatory fixtures.—Adv.

For Sale Cheap

A full set of Durham House Drainage Fittings, Ells, Tees, T.Y's etc. If interested, will send full information and price. Address "Drainage", care of Domestic Engineering, 91 Centre St., New York

The sun gives out more heat than any heater we have yet discovered. Next to it, the "Winchester" Steam or Hot Water Heater has the record. But then, that is what it was made for, by Smith & Thayer Co., Boston, Mass.—Adv.

TRADE WANTS.

FOR SALE—1,320 FT. SECOND-HAND INDIRECT steam radiation as good as new. Address the Alton Plumbing & Heating Co., Alton, Ill. 10-3 & Mo.

WANTED—ANY REPUTABLE SALESMAN of Plumbers' Supplies to carry Taylor Manufacturing Company's line. Address for terms and information Taylor Manufacturing Company, Ltd., 48 State St., Detroit, Mich. W. & M. t.f.

WANTED—FOR PACIFIC COAST OR CALIfornia, by reliable manufacturers' agents in San Francisco, accounts on commission or salary basis for the jobbing trade. Address Broker, care Domestic Engineering, 64 North Jefferson St., Chicago. Mo-10-11-12

ANY CONCERN DESIRING AN IMMEDIATE entree for marketable goods to practically every plumbing supply, heating and range house in the eastern, middle and bordering western and southern states can procure same through the service of the advertiser. Seven years' acquaintanceship with this trade. Address "Ingram," 22 W. Lombard Street, Baltimore, Md. t.f. w. & m.

FITTINGS CHEAP.—FOR SALE A LOT OF malleable and cast iron pipe fittings, including black and galvanized caps, tees, elbows, crosses, lock nuts, reducers, 45 degree elbows, bushings and flange unions; also ¼-inch, ⅜-inch and ½-inch wrought iron couplings; all in perfect condition; standard makes; complete list on application. ANTON J. BERGER, 988 N. Talman avenue, Chicago. 11-7&OctMo

DOMESTIC ENGINEERING

MONTHLY EDITION

Plumbing, Heating, Lighting, Ventilating, Engine, Mining and Mill Supplies.

Office of publication: 58-64 N. Jefferson Street, Chicago.

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ADVERTISING

Copy and cuts for monthly advertisements should be received by the first of the month, for weekly edition not later than Tuesday. We cannot guarantee insertions or changes in advertisements if received later.

Entered in the Postoffice in Chicago, Illinois, as mail matter of the second class.

Member of the Trade Press Association.
Member of the Manufacturers' Credit Co.

OCTOBER 24, 1903.

The Kenney Manufacturing Company

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D. T. KENNEY, Consulting Engineer

Manufacturers of the
"Flushometer"
(TRADEMARK)
OFFICE AND SALESROOM:
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Telephone—6818-18th St.

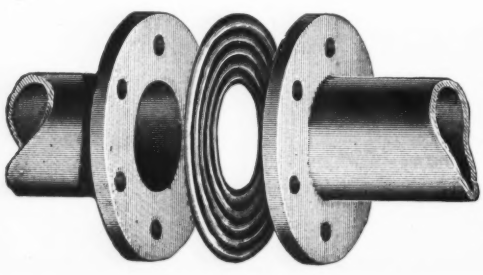
August 1st, 1903.

NOTICE---Beware of Infringers.

TO THE TRADE:—We desire to call the attention of the trade to the fact that we are now the owners of all the United States and Foreign patents granted to D. T. Kenney for flushing valves, and of the United States patent to W. S. Cooper, No. 371,431, for similiar devices. It is our intention fully to protect these patents and promptly to prosecute all infringers of the same. Infringement suits have already been begun in the United States Circuit Court of this District against the Wells and Newton Company of this city for selling the so-called "Aquameter" valve made by the Federal Company of Chicago. Suits against other infringers are to follow.

Respectfully yours,

THE KENNEY MANUFACTURING COMPANY.



OUR PATENTED

MINERAL WOOL PIPE COVERING AND COPPER GASKETS

THEY SAVE STEAM AND MAKE ABSOLUTELY TIGHT JOINTS

BEST AND CHEAPEST SAMPLES FREE

UNITED STATES MINERAL WOOL CO.
143 Liberty Street, NEW YORK.

May 1, 1903.

OUR RECORD

Sales of Water Meters Made and Sold by Thomson Meter Co.

In Year	
1894	12,812
1895	14,076
1896	15,542
1897	16,115
1898	20,062
1899	25,145
1900	26,414
1901	23,126
1902	24,635
	177,927
1903—to April 27	6,332
Meters sold prior to year 1894	46,600

We stamp our meters only when sold. Catalogue sent on application.

Thomson Meter Co.

79 Washington Street, Brooklyn, N. Y.

The Champion

Water Filter

Is the only perfect and complete one!

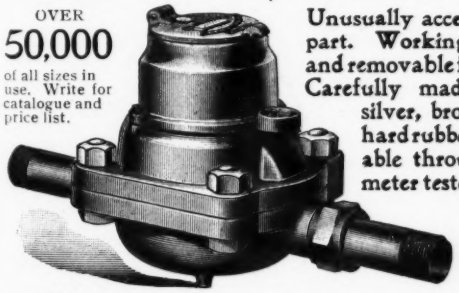
Simple, easily cleaned and operated. Fits any faucet. Catalogue and prices of complete line upon application.

The Champion Safety Lock Co.

GENEVA, OHIO.

The Niagara Water Meter

OVER **50,000** of all sizes in use. Write for catalogue and price list.



Unusually accessible in every part. Working parts separate and removable from outer case. Carefully made of German silver, bronze, brass and hard rubber. Interchangeable throughout. Each meter tested for accuracy and to a hydraulic pressure of 300 lbs. per sq. inch.

Buffalo Meter Co., 290 TERRACE, **Buffalo, N. Y.**

PERTH AMBOY CERAMIC COMPANY

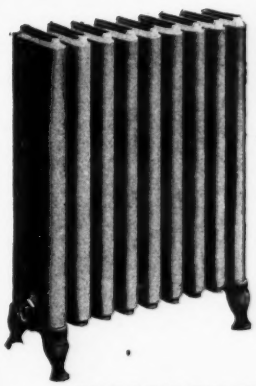
PERTH AMBOY, N. J.

Manufacturers of

Solid Porcelain Sinks, Washtrays, etc.

Price list and trade discounts sent upon application.

BRASS BRONZE COPPER STEEL RADIATORS



KINNEAR TRADE MARK HOOD

KINNEAR RADIATORS

excel in artistic appearance, greatest heating surface in limited floor space, increased efficiency and decreased weight.

DURABILITY GUARANTEED

Beautifully finished to conform to any interior decoration.

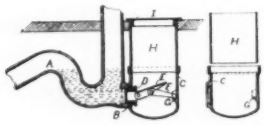
WRITE FOR CATALOGUE NO. 5.

KINNEAR-HOOD STEEL COMPANY

No. 141 Broadway, New York City.

PATENTS AND INVENTIONS

738,289. Trap clean-out. John Buckley, Everett, and Joseph W. Buckley, Chelsea, Mass.



Frank Walsh, Atlantic City, has some alteration work on hand in which he is using Cooper's closets.—Adv.

736,220. Fresh-air inlet for sanitary ventilation of the drainage systems of houses, buildings, or the like. George Cody, New York, N. Y., assignor of one-half to Louis Munzinger, New York, N. Y.

Henry Schleuning, Allegheny, is placing Cooper's closets in some work he has in hand.—Adv.

736,246. Variable exhaust-nozzle. George H. Gray, Denver, Colo.

Zoller & Craighead, Richmond, Ind., have some alteration work on hand, in which Cooper's Nautilus closet is being used.—Adv.

736,263. Lubricator. Harry James, Marlow, Ind. Ter.

F. B. Wood, Everett, Mass., is placing Cooper's Nautilus closets and other of Cooper's fixtures in a house in that city.—Adv.

736,283. Soldering-iron. Robert E. Manley, Media, Pa.

Smith & Forbes, Boston, Mass., are remodeling the plumbing in a residence in that city, using Cooper's Nautilus closet.—Adv.

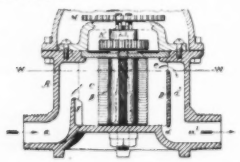
735,692. High-speed rotary pump. John W. Alvor, Chicago, Ill.

Holley, Mason, Marks & Co., Spokane, Wash., are furnishing three of Cooper's Nautilus closets for some work which is being done in their city.—Adv.

735,693. Feed-water heater and purifier. Robert D. H. Anderson, Cincinnati, Ohio.

A. W. Scott, Minneapolis, is installing three of Cooper's Nautilus closets in the Bank of Commerce Building.—Adv.

738,836. Rotary water-meter. Frank L. Northrop, Worcester, Mass, assignor to Union Water Meter Company, Worcester, Massachusetts.



Keefe Bros., Oswego, N. Y., are using some of Cooper's goods in work they have on hand.—Adv.

Cope Pattern Works
Detroit, Mich.
Steam and Hot Water Boilers, Radiators, etc.

E. S. Haynes, West Newton, Mass., has a contract for plumbing a residence in that city and is using Cooper's closets, lavatories and other plumbing fixtures.—Adv.

735,715. Feed-water Heater and Purifier. Cleophus K. Cunningham, Algonquin, Ohio, assignor of one-half to William Loofbourrow, Carrollton, Ohio.

The G. W. Dart Hardware Company, Dillin, Mont., is installing a bathroom in a residence in that city, using Cooper's fixtures.—Adv.

735,719. Valve. Louis N. Davis, Westchester, Pa.

Mock & Cook, Indianapolis, have a contract in which they are using Cooper's closets.—Adv.

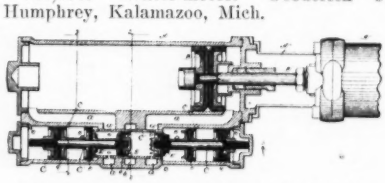
735,733. Drain-valve. Clayton A. Dunham, Marshalltown, Iowa.

Hayes Bros., Indianapolis, are placing three of Cooper's Nautilus closets in a residence in that city.—Adv.

735,734. Wrench. Clarence C. English, San Francisco, Cal.

W. D. Theobald & Co., Canton, are remodeling the plumbing in a residence in that city, using Cooper's Nautilus closets.—Adv.

738,806. Water-motor. Frederick J. Humphrey, Kalamazoo, Mich.



M. J. O'Neil, St. Paul, is placing three of Cooper's closets in an operation he has under way.—Adv.

735,104. Water gauge valve. John C. F. Jones, Braddock, Pa.

W. J. McGuire & Co., Toronto, are installing two of Cooper's Nautilus closets in a residence in that city.—Adv.

736,372. Pipe-wrench. Andy Fasenmeyer, Titusville, Pa., assignor of one-half to William Bayliss, Titusville, Pa.

M. F. Jones, Philadelphia, is using Cooper's goods in some work he has on hand.—Adv.

736,664. Oil-burner. Thomas Williams, San Francisco, Cal., assignor of one-half to Ceasar R. Spliralo, San Francisco, Cal.

John H. Johnson Co., Saginaw, Mich., have a contract in which Cooper's goods are being used.—Adv.

736,487. Oil-burner nozzle. Henry E. Brunner and Edie J. Patterson, Haywards, Cal.

Harry C. Melon, Philadelphia, is plumbing a business property on Front and Spruce streets, using Cooper's closets and lavatories.—Adv.

736,504. Flushing apparatus. Frederic N. Dixon, Philadelphia, Pa., assignor to William U. Griffiths and Andrew McGuckin, Philadelphia, Pa.

Currie Co., Atlantic City, N. J., are doing some work in the Shelburne Hotel, using Cooper's Nautilus closets.—Adv.

736,563. Automatic regulator for liquid-fuel burners. Alfred C. Stewart, Santa Paula, Cal.

Crane & Ordway Co., St. Paul, are furnishing six of Cooper's Reno closets for a building in that city.—Adv.

736,604. Gas-tip. William Kramer, Brooklyn, N. Y., assignor to Gas-Tip and Self-Lighter Company, New York, N. Y., a corporation of New York.

W. P. Ogelsby, Philadelphia, is plumbing the residence of Mr. Woolman, using Cooper's closets, baths, lavatories and other plumbing fixtures.—Adv.

736,681. Gas-lamp. Tom Brabson, Brooklyn, N. Y., assignor to Fulton Brass & Manufacturing Company, Brooklyn, N. Y., a corporation of New York.

Stradling Plumbing & Htg. Co., Utica, N. Y., have some alteration work on hand in which Cooper's closets are being used.—Adv.

736,800. Water-heater. Wesley E. Vanstone, New Westminster, Canada.

F. E. Colburn, Norwood, Mass., is installing three of Cooper's Nautilus closets in a residence in that city.—Adv.

736,820. Pop safety-valve. John Collis, Des Moines, Ia., assignor to William P. Collis, New York, N. Y.

McKeough-Danquer Plumbing Co., Utica, N. Y., are using Cooper's closets in some work they have on hand.—Adv.

736,842. Steam-trap. Thomas J. Grace, Mobile, Ala.

Wm. S. Cooper Brass Works, Philadelphia, recently made a shipment of Atavic valves to London.—Adv.

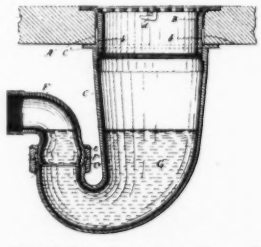
736,898. Heating apparatus for tanks. Elmer O. Whittington, Oxford, Ia.

E. W. Openshaw, Newport, R. I., is placing Cooper's Nautilus closets in a residence in that city.—Adv.

736,507. Radiator. Edgar V. Seeler, Philadelphia, Pa., assignor to Hosford D. Kellogg, Philadelphia, Pa.

Gray & Dormer, Philadelphia, are installing Cooper's goods in some operations they have on hand.—Adv.

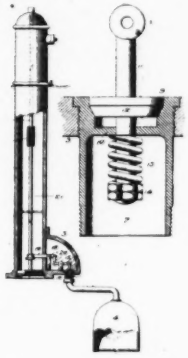
739,154. Combined trap and thimble. James Crawford, Boston, Mass.



The Keith-Fitzsimmons Co., Toronto, Ont., are using Cooper's goods in some contracts they have under way.—Adv.

WIRE BRUSHES
to order for BOILERS and FOUNDRIES.
Write for prices.
Brackett & Flint, 103 Merrimac St., Boston

739,684. Anti-feezing fire plug. John F. Kehr, Trenton, N. J.



Joseph Geisenberger, Philadelphia, has a contract for plumbing the residence of H. H. Haines, Cooper's fixtures being used throughout.—Adv.

736,451. Water-tube boiler. Giulio Silvestri, Vienna, Austria-Hungary.

Stinson, Kennedy & Co., Pittsburg, Pa., have some alteration work on hand in which they are using Cooper's Nautilus closets.—Adv.

736,488. Gas-valve water-seat. Emanuel Bumford, Birmingham, Ala.

Chas. McCoy, Philadelphia, is plumbing the school house at 4th and George streets, using Cooper's Nautilus closets and other of Cooper's fixtures.—Adv.

737,562. Air and water heating apparatus. Charles Atkins, Springfield, Mass.

Louis A. Menegaux, Union Hill, N. J., is plumbing the Peoples National Bank Building, using two of Cooper's Nautilus closets.—Adv.

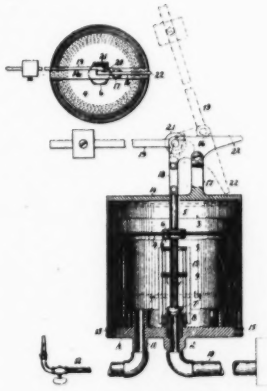
737,593. Gas regulating and saving apparatus. Haring H. Dikema, Leipzig, Germany.

Wm. Calhoun, Camden, N. J., is plumbing the residence of Mr. Stockum, using Cooper's baths, lavatories and other plumbing fixtures.—Adv.

737,618. Apparatus for coating metal pipes or conduits. George W. Harrington, Wakefield, Mass., assignor to Thomas E. Dwyer, Wakefield, Mass.

A. L. Hersum, Boston, is using Cooper's baths, lavatories, Nautilus closets, needle baths and other plumbing fixtures in a large residence in that city.—Adv.

740,145. Safety Gas-Supply-Pipe Attachment. Frederick W. Krohn, San Francisco, Cal.



The A. C. Eynon Plumbing Co., Canton, Ohio, are installing Cooper's Nautilus closets, lavatories, baths and other plumbing fixtures in a fine residence in that city.—Adv.

John C. Dunn, Indianapolis, Ind., is plumbing a residence, using three of Cooper's closets.—Adv.

737,632. Gas distributing chandlier. Jacob C. Jennings, Columbus, Ohio, assignor to the Columbus Polishing and Plating Company, Columbus, Ohio, a corporation of Ohio.

Bellamy & Hornung are placing three of Cooper's Nautilus closets in the house of Mrs. Benj. Gallaher.—Adv.

737,649. Oil burner. Alfonso F. Murphy, Cleburne, Taxas.

Fitzpatrick & Hoepfner, Columbus, Ohio, are placing Cooper's Nautilus closets in a residence in that city.—Adv.

737,676. Oil burner. George W. Swartz, Huntsville, Ala., assignor of one-half to B. H. Lindsey, Bellemina, Ala.

John Reid, Merchantville, N. J., is plumbing the residence of Mr. Bennett, using Cooper's closets, lavatories, baths and other plumbing fixtures.—Adv.

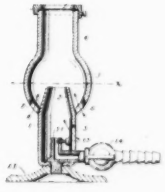
737,681. Valve. John B. Waring, East Orange, N. J., assignor by mesne assignments, to Waring Patens Company, New York.

Clark & Sons, Indianapolis, are installing some of Cooper's goods in a fine residence in that city.—Adv.

737,738. Vapor generator. Charles F. Hitchcock, Oakland, Cal., assignor, by mesne assignments, to Eagle Engine Co., San Francisco, Ca., a corporation.

F. J. McGarry & Bro., Philadelphia, are installing Cooper's closets, baths and other plumbing fixtures in a residence on 43d street.—Adv.

740,150. Bunsen Gas Heating-Burner. James J. Lawler, Mount Vernon, N. Y.



E. B. Andress & Bro., Camden, N. J., are placing Cooper's fixtures in a building in that city.—Adv.

737,771. Water heater. Lawrence M. Rehnquist, Chicago, Ill.

737,839. Filter. William H. Hodshon, Danbury, Conn.

737,847. Pipe wrench. George W. Johnson, Erie, Pa.

Wm. Forbes & Son, Lawrence, Mass., are placing Cooper's closets, baths and lavatories in a residence in that city.—Adv.

737,589. Cistern. John Nelson, Chicago, Ill., assignor to Illinois Malleable Iron Company, Chicago, Ill., a corporation of Illinois.

J. F. Lenehan, Philadelphia, is placing four of Cooper's Nautilus closets in a schoolhouse.—Adv.

737,941. Valve or cut-off for tanks. Peter J. Leithauser, Clarendon, Tex.

738,178. Hydrocarbon burner. Charles H. George, Yoakum, Tex.

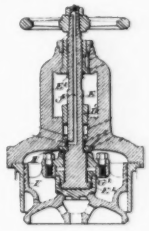
P. Cregan, Chicago, is remodeling the plumbing in the residence of Mr. Wells, using Cooper's closets.—Adv.

738,191. Acetylene gas generator. John T. Heaton, Auburn, Me., assignor of one-half to Joseph Heaton, Auburn, Me.

738,199. Adjustable gas check. John F. W. Jost, Philadelphia, Pa.

J. V. Regan, Philadelphia, is using Cooper's goods in some work he has under way.—Adv.

740,186. Valve Construction. Louis Schutte, Philadelphia, Pa.



Geo. H. Emerson, Cynwyd, Pa., is placing Cooper's closets, baths and other plumbing fixtures in the residence of Mr. Frederick T. Hays.—Adv.

738,216. Pipe-wrench. William Littley, Philadelphia, Pa.

738,244. Pump. John C. Roth, Columbus, Ind.

F. J. McGarry & Bro., Philadelphia, are plumbing a residence on Belmont avenue, using Cooper's fixtures.—Adv.

738,277. Multiple Molding apparatus. Arthur K. Beckwith, Dowagiac, Mich.

Lundy & Shinn, Newtown, Pa., are plumbing a residence in whierh they are using Cooper's lavatories and closets and baths.—Adv.

738,319. Acetylene gas generator. William A. Gribble, Aubrey, Tex.

J. S. Boyd, Boston, is placing Cooper's closets and other fixtures in a residence in that city.—Adv.

738,358. Furnace. David M. Reel, Brooklyn, N. Y., assignor to the Underfeed Stoker Company of America, Chicago, Ill., a corporation of New Jersey.

F. J. McGarry & Bro., Philadelphia, is plumbing two residences on Westminster avenue, using Cooper's goods.—Adv.

738,362. Valve. Henry J. Schmitt, Wyndmoor, Pa.

F. J. McGarry & Bro., Philadelphia, are placing Cooper's goods in a residence on Penn's Grove street.—Adv.

738,418. Safety gas-burner. Ernest A. d'Aquila, Newark, N. J., and Bernardo Martelli, New York, N. Y.

Bellamy & Hornung, Omaha, are remodeling the plumbing in a residence in that city, using Cooper's Nautilus closets.—Adv.

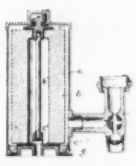
738,751. Feedwater heater and purifier. John Angell, St. Louis, Mo.

Kraus-Kirn & Co., Akron, O., have some alteration work under way in which they are using Cooper's Nautilus closets.—Adv.

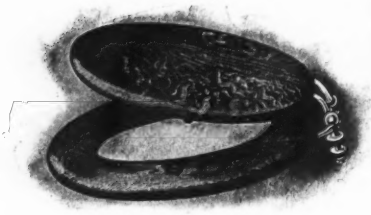
738,755. Hydrocarbon-burner. James E. Bancroft, Toledo, Ohio.

Mulligan & Schermerhorn, Troy, N. Y., are remodeling the plumbing in a residence in that city, using Cooper's Nautilus closets.—Adv.

740,381. Filter. Ezra W. Hasenpflug, East Cleveland, Ohio, assignor to the Champion Safety Lock Company, Geneva, Ohio, a Corporation of Ohio.



Newton & Gray, Philadelphia, are placing Cooper's needle baths and other plumbing fixtures in the residence of Mr. Rodman Wanamaker.—Adv.



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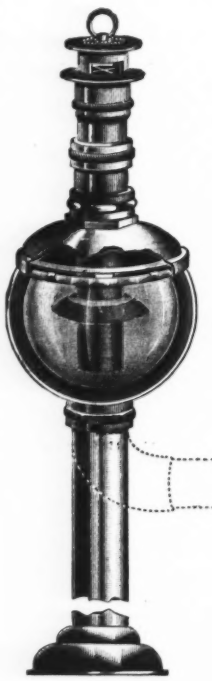

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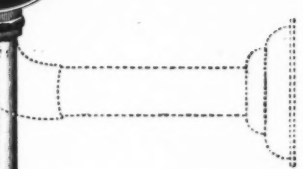

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J. H. Cogan & Co., Augusta, Me., are plumbing a house in Foxcroft, Me., using Cooper's Nautilus closets.—Adv.

738,827. Acetylene generator. Walter S. May, Clifton, Ariz.

Scoville-Wills Htg. & Plmg. Co., Pueblo, Col., are placing Cooper's goods in some work they have on hand.—Adv.

739,055. Thermostatic heat-regular. Albert M. Butz, Oakpark, Ill.

Levi Case & Co., Schenectady, N. Y., are using Cooper's closets in some work they have on hand.—Adv.

738,922. Vapor-burner. John Lawson and John E. Daniels, Calais, Me.

Est. J. S. Borie, Philadelphia, are placing Cooper's goods in a residence in their city.—Adv.

739,162. Attachment for basins, sinks, or like fixtures. Warwick Ford, New York, N. Y.

Worrell, Shinn & Co., Princeton, N. J., are using Cooper's goods in some work they have on hand.—Adv.

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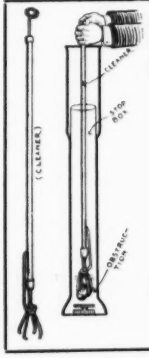

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Cocks, Ball.
Boston Brass Co., Boston, Mass.
Glauber Brass Mfg. Co., Cleveland, O.
Ohio Pump & Brass Co., The, Columbus, O.
Savill, Thomas, Philadelphia.

Cocks, Bath.
Dearborn Brass Co., Cedar Rapids, Ia.

Cocks, Hopper.
Kelly & Bros., Thos., Chicago.

Cocks, Pet.
Clayton & Lambert Mfg. Co., Detroit Mich.

Cocks, Stop and Waste.
Campbell Brass Works, J. B., Erie, Pa.
Central Brass Mfg. Co., The, Cleveland, O.
Central Supply Co., Minneapolis, Minn.
Farnan Brass Works, Cleveland, O.
Mueller Mfg. Co., H., Decatur, Ill.

Combination Sinks and Tubs.
Minn's Sink & Specialty Co., Brooklyn.

Compression Work.
Campbell Brass Works, J. B., Erie, Pa.
Central Brass Mfg. Co., The, Cleveland, O.
Scully Mfg. Co., W. J., Detroit, Mich.
Stebbins Mfg. Co., E., Springfield, Mass.
Street & Kent Mfg. Co., Chicago.

Copper Work for Plumbers.
Trageser Steam Copper Works, John New York.

Couplings, Closet Repair.
Sproul & McGurrin, Grand Rapids, Mich

Couplings, Union.
Dart Mfg. Co., E. M., Providence, R. I.

Coverings, Asbestos.
Canadian Asbestos Co., Montreal, Que.
Norristown Covering Co., Norristown, Pa.
Watson Co., H. F., Erie, Pa.

Coverings, Pipe and Boiler.
Canadian Asbestos Co., Montreal, P. Q.
Keasbey, Robt. A., New York.
Norristown Covering Co., Norristown, Pa.
United States Mineral Wool Co., New York.
Watson Co., H. F., Erie, Pa.
Wyckoff & Sons Co., A., Elmira, N. Y.

Covers.
The McCullough-Dalzell Crucible Co., Pittsburg, Pa.

Crucibles.
The McCullough-Dalzell Crucible Co., Pittsburg, Pa.

Designing.
Jungblut & Co., F. G., Chicago.

Dies, Pipe.
Hollands Mfg. Co., Erie, Pa.

Die Stocks.
Boston Brass Co., Boston, Mass.
Curtis & Curtis Co., Bridgeport, Conn.
Oster Mfg. Co., The, Cleveland, O.
Hollands Mfg. Co., Erie, Pa.

Ditching Jacks.
Dunn Mnfg. Co., Pittsburg, Pa.

Drainage Fittings.
Garratt & Co., W. T., San Francisco, Cal.

Drawings.
Bretsnyder, Wm., Chicago.

Drinking Fountains.
Metropolitan Filter Co., Chicago.

Earthenware, Sanitary.
Trenton Potteries Co., The, Trenton, N. J.

Ejectors.
Champion Safety Lock Co., The, Geneva, O.

Electric Diamond Grinders.
Luther Bros., North Milwaukee, Wis.
Wickes, John C., New York.

Electric House Service Pumps.
Quimby, Wm. E., New York.

Electrotypes.
Jungblut & Co., F. G., Chicago.

Enameled Ware.
Central Supply Co., Minneapolis.
Humphryes Mfg. Co., The, Mansfield, O.
McShane Mfg. Co., Henry, Baltimore, Md.
McVay & Walker, Braddock, Pa.
Rome Sanitary Works, Rome, N. Y.
Rundle Mfg. Co., Milwaukee, Wis.
Sanitary Specialty Mfg. Co., Chicago.
Standard Sanitary Mfg. Co., Pittsburg, Pa.
Wickes, John C., New York City.
Wolff Mfg. Co., L., Chicago.

Engines, Hot Air Pumping.
American Machine Co., Wilmington, Del.
Rider-Ericsson Engine Co., New York.

Engines, Pumping.
American Machine Co., Wilmington, Del.
Rider-Ericsson Engine Co., New York.

Engravings.
Jungblut & Co., F. G., Chicago.
Manz-Hollister, Chicago.

Exhaust Steam Heating System.
Webster & Co., Warren, Camden, N. J.

Fans for Mechanical Draft.
American Blower Co., Detroit, Mich.

Fan Systems of Heating and Ventilating.
American Blower Co., Detroit, Mich.

Faucets.
Asbell Co., S. J., Paterson, N. J.
Federal Co., Chicago.
Federal Mfg. Co., Chicago.

Feed Water Heaters and Purifiers.
Webster & Co., Warren, Camden, N. J.

Ferrules.
Harvey's Sons Mfg. Co., Ltd., A., Detroit, Mich.
Hays Mfg. Co., Erie, Pa.
Lausten Lead Works Chicago.
Raymond Lead Co., Chicago.

Filters, Water.
Berry, Edwin F., Philadelphia.
Champion Safety Lock Co., The, Geneva, O.
Loomis-Manning Filter Co., Philadelphia.
Metropolitan Filter Co., Chicago.

Fittings for Closet and Urinal Stalls.
Columbus Brass Co., The, Columbus, O.

Fittings, Drainage.
Crane Co., Chicago.

Fittings, Flange.
John Simmons Co., New York.

Fittings, Pipe.
Crane Co., Chicago.
Davis Company, The John, Chicago.

Fixtures, Gas, Electric and Combination.
Frink, I. P., New York.
National Plumbing Supply Co., New York.
Williamson & Co., R., Chicago.

Floats, Seamless Copper Ball.
Naugatuck Mfg. Co., Naugatuck, Conn.

Floor and Ceiling Plates.
Beaton & Corbin Mfg. Co., The, Southington, Conn.
Nelson Mfg. Co., N. O., St. Louis.
Smith & Thayer Co., 234-236 Congress St., Boston, Mass.

Flushometer.
Kenney Mfg. Co., New York City.

Force Pumps.
Giant Pump Co., Philadelphia.

Fuller Balls.
Bell, Andrew, Newark, N. J.

Fuller Bibbs.
Dearborn Brass Co., Cedar Rapids, Ia.

Fuller Work.
Central Brass Mfg. Co., The, Cleveland, O.
Ryan & Co., J. J., Chicago.
Mueller Mfg. Co., H., Decatur, Ill.
Scully Mfg. Co., W. J., Detroit, Mich.
Stebbins Mfg. Co., E., Springfield, Mass.
Street & Kent Mfg. Co., Chicago.

Furnaces, Warm Air.
Boynton Furnace Co., The, Chicago.
International Heater Co., Utica, N. Y.
Magee Furnace Co., Boston, Mass.
Reading Stove Works, The, Reading, Pa.
Richmond Co., Norwich, Conn.
Utica Heater Co., Utica, N. Y.

Gas Appliances.
Lawson Mfg. Co., Homestead, Pa.
Williamson & Co., R., Chicago.

Gas Arc Lamps.
Bernstein Co., The S., New York, N. Y.
Cluster Gas Light Co., New York, N. Y.
Monarch Gas Arc Light Co., Brooklyn, N. Y.

Gas Controllers.
Crane Co., Wm. M., New York.

Gaskets, Boiler.
Canfield, H. O., Bridgeport, Conn.

Gaskets, Corrugated Copper.
United States Mineral Wool Co., New York.

Gas Machines.
Kemp Mfg. Co., C. M., Baltimore, Md.

Gas Stoves and Ranges.
Abendroth Bros., Port Chester, N. Y.
Welskittel & Son, A., Baltimore, Md.

Gas Tubing.
Kieserling, R. H., Cincinnati, O.

Gauges and Valves.
Standard Gauge Mfg. Co., Syracuse, N. Y.
National Steam Specialty Co., Chicago.

Gauges, Steam and Altitude.
American Steam Gauge & Valve Mfg Co., Boston, Mass.
Crosby Steam Gauge & Valve Co., Boston, Mass.

Graphite, Lubricating.
Dixon Crucible Co., Joseph, Jersey City, N. J.

Grease Traps.
Freeport Plumbing & Heating Co., Freeport, Ill.

Guard Work.
Powell Co., The Wm., Cincinnati, O.

Ground Key Work.
Mueller Mfg. Co., H., Decatur, Ill.
Powell Co., The Wm., Cincinnati, O.
Stebbins Mfg. Co., E., Springfield, Mass.

Hangers, Pipe.
Beaton & Corbin Mfg. Co., The, Southington, Conn.
Jarecki Mfg. Co., Erie, Pa.
Kriebel & Co., Philadelphia.
Penn Engineering Co., The, Philadelphia.
Reed Mfg. Co., Erie, Pa.
Simmons Co., John, New York.
Sproul & McGurrin, Grand Rapids, Mich.

Heating Apparatus.
Paul System Co., Boston, Mass.

Heat Regulators, Electric.
Waterbury Electric Co., Waterbury, Conn.

Heaters, Tank.
Boynton Furnace Co., The, Chicago.

Hooks, Pipe.
Berger Bros. Co., Philadelphia.

Hose Carts.
Wirt & Knox Mfg. Co., Philadelphia, Pa.

Hydrants, Yard, Fire and Wall.
Hays Mfg. Co., Erie, Pa.

Hydraulic Leather and Cups.
Houghton & Co., E. F., Philadelphia and Chicago.

Hydro Carbon Lighting Devices.
White Mfg. Co., Chicago.

Indicators.
Crosby Steam Gauge & Valve Co., Boston, Mass.

Ingot Metals.
Blatchford & Co., E. W., Chicago.

Injectors.
Champion Safety Lock Co., The, Geneva, O.
Regester's Sons, J., Baltimore.

Insertable Joints.
Estabrook's Sons, R., South Boston, Mass

Laundry Trays.
Alberene Stone Co., Chicago.

Laundry Trays, Porcelain.
American Porcelain Co., New Brighton Pa.

Lavatories.
Froelich Bros., Philadelphia, Pa.

Lavatories, Porcelain.
American Porcelain Co., New Brighton Pa.
Wolff Mfg. Co., L., Chicago.

Lavatories, Vitreous.
Sanitary Earthenware Specialty Co., Trenton, N. J.

Lead Pipe and Sheet Lead.
Blatchford & Co., E. W., Chicago.
Du Bois & Co., F. N., New York.
Fleck Bros. Co., Philadelphia.
Lausten Lead Works, Chicago.
Raymond Lead Works, Chicago.
Robertson Mfg. Co., James, Baltimore, Md.

Lead Traps.
Robertson Mfg. Co., James, Baltimore, Md.

Machine Tools.
Warner & Swasey Co., The, Cleveland, O.

Marble Work for Plumbers.
Forsyth Granite & Marble Co., Ltd., Montreal, P. Q.
Wolff Mfg. Co., L., Chicago.

Meter Boxes.
Buffalo Meter Co., Buffalo, N. Y.

Meters, Water.
Buffalo Meter Co., Buffalo, N. Y.
Thomson Meter Co., Brooklyn, N. Y.

Meters, Fuel Oil.
Buffalo Meter Co., Buffalo, N. Y.

Mineral Wool.
United States Mineral Wool Co., New York.

Nipple Machines.
Merrell Mfg. Co., Toledo, O.

Nipple Holders.
Curtis & Curtis Co., Bridgeport, Conn.

Nozzles.
The McCullough-Dalzell Crucible Co., Pittsburg, Pa.

Oil, Cylinder.
Houghton & Co., E. F., Philadelphia and Chicago.

Packings.
Houghton & Co., E. F., Philadelphia.
Jenkins Bros., New York.
Norristown Covering Co., Norristown, Pa.

Paint, Graphite.
Dixon Crucible Co., Joseph, Jersey City, N. J.

Patterns and Models.
Cope Pattern Works, Detroit, Mich.
Gobeille Pattern Co., Cleveland, O.
Michigan Stamping Co., Detroit, Mich.
Olmstead Co., H. B., New York.
Penn Pattern Works, Chester, Pa.

Phosphorizers.
The McCullough-Dalzell Crucible Co., Pittsburg, Pa.

Pipe and Fittings, Soil.
Abendroth Bros., Port Chester, N. Y.
Central Foundry Co., New York.
McVay & Walker, Braddock, Pa.
Millar & Son Co., Charles, Utica, N. Y.
Nelson Mfg. Co., N. O., St. Louis, Mo.
Simmons Co., John, New York.
Wickes, John C., New York.
Wolff Mfg. Co., Chicago.

Pipe Threading and Cutting Machinery.
Armstrong Mfg. Co., The, Bridgeport, Conn.
Bignall & Keeler Mfg. Co., Edwardsville, Ill.
Curtis & Curtis Co., Bridgeport, Conn.
Hart Mfg. Co., Cleveland, O.
Jarecki Mfg. Co., Erie, Pa.
Merrell Mfg. Co., Toledo, O.
Oster Mfg. Co., The, Cleveland, O.
Trimont Mfg. Co., Roxbury, Mass.

Pipe Cutters.
Bignall & Keeler Mfg. Co., Edwardsville, Ill.
Curtis & Curtis Co., Bridgeport, Conn.
Hollands Mfg. Co., Erie, Pa.
Kemp Mfg. Co., C. M., Baltimore, Md
Reed Mfg. Co., Erie, Pa.
Saunders Sons, D., Yonkers, N. Y.

Pipe Joint Compound.
Dixon Crucible Co., Joseph, Jersey City, N. J.

Pipe Straps.
Berger Bros. Co., Philadelphia, Pa.
Smith & Egge Mfg. Co., The, Bridgeport, Conn.

Plumbago.
The McCullough-Dalzell Crucible Co., Pittsburg, Pa.

Plumbers' Chain.
Smith & Egge Mfg. Co., The, Bridgeport, Conn.

Plumbers' Furnace.
Murray, John A., New York, N. Y.

Plumbers' Gasoline Fire Pots and Torches.
Clayton & Lambert Mfg. Co., Detroit, Mich.

Plumbers' Rubber Goods.
Canfield, H. O., Bridgeport, Conn.

Plumbers' Slate Work.
Fleming Slate Co., Poultney, Vt.

Plumbers' Supplies.
Campbell Brass Works, J. B., Erie, Pa.
Davis Company, The John, Chicago.
Du Bois & Co., F. N., New York.
Federal Co., Chicago.
Fleck Bros. Co., Philadelphia.
Griffiths & Quinn Co., Chicago.
Knight, Thos. G., Brooklyn, N. Y.
Malbin & Kammerman, New York.
Mitchell & Van Meter Company, New York, N. Y.
Millar & Son Co., Charles, Utica, N. Y.
National Brass & Metal Co., Minneapolis, Minn.
National Plumbing Supply Co., New York.
National Supply Co., The, Toledo, O.
Nelson Mfg. Co., N. O., St. Louis.
New York Washer Works Co., New York.
Ohio Pump & Brass Co., The, Columbus, O.
Perkes, Charles, Philadelphia.
Rome Sanitary Works, Rome, N. Y.
Rundle Mfg. Co., Milwaukee, Wis.
Simmons Co., John, New York.
Stambach & Love, Philadelphia.
Standard Sanitary Mfg. Co., Pittsburg, Pa.
Sanitary Specialty Mfg. Co., Chicago.
Tay Co., Geo. H., San Francisco, Cal.
Wolff Mfg. Co., L., Chicago.
Young, Joseph H., Boston, Mass.

Plumbers' Woodwork.
Carey, R. E., New York.
Crosby & Pool Co., Ltd., Port Huron, Mich.
Ideal Mfg. Co., The, Detroit, Mich.
Milford Mfg. Co., Milford, Mich.
National Supply Co., The, Toledo, O.
Olmstead Co., H. B., New York.
Rumsey Mfg. Co., L. M., St. Louis, Mo.
Standard Sanitary Mfg. Co. of Michigan, Detroit, Mich.

Pressed Steel Shop Pans.
Kilbourne & Jacobs Mfg. Co., The, Columbus, O.

Pumps.
American Machine Co., Wilmington, Del.
Humphryes Mfg. Co., The, Mansfield, O.
Modern Iron Works, Quincy, Ill.
Wyckoff & Son Co., A., Elmira, N. Y.

Pumps, Combination Air, Force and Test.
Perkes, Charles, Philadelphia.

Radiator Shields.
Decatur Cornice & Roofing Works, Decatur, Ill.
Monash-Younker Co., Chicago.

Radiators, Steam and Hot Water
American Radiator Co., Chicago.
Canada Radiator Co., Port Hope, Ont.
Gurney Heater Mfg. Co., Boston.
Holland Radiator Co., Chicago.
Kellogg-Mackay-Cameron Co., Chicago.
Kewanee Boiler Co., Kewanee, Ill.
McLain Co., J. H., Canton, O.
Mott Iron Works, J. L., New York.
National Radiator Co., Johnstown, Pa.
New York Radiator Co., Utica, N. Y.
Phelps Bros., New York.
Shirley Radiator & Foundry Co., Indianapolis, Ind.
Smith Co., The H. B., Westfield, Mass.
United States Heater Co., Detroit, Mich.
Utica Heater Co., Utica, N. Y.
United States Radiator Co., Dunkirk, N. Y.

Ranges.
Magee Furnace Co., Boston.

Ratchet Stocks.
Kemp Mfg. Co., C. M., Baltimore, Md.

Reamer, Convex.
Taylor Mfg. Co., Detroit, Mich.

Reflectors.
Frink, I. P., New York.

Regulators, Air.
Asbell Co., S. J., Paterson, N. J.

Regulators, Hot Water Tank.
Powers Regulator Co., Chicago.

Regulators, Temperature.
Powers Regulator Co., The, Chicago.
Ross Valve Co., Troy, N. Y.

Rubber Stoppers.
Canfield, H. O., Bridgeport, Conn.
Powell Co., The Wm., Cincinnati.

Sanitary Earthenware.
American Porcelain Co., New Brighton Pa.
Graham Chemical Pottery Works, Chas., Brooklyn.
Great Western Pottery Co., Kokomo, Ind.
Maddock & Sons, John, Trenton, N. J.
Riverside Pottery Co., Wheeling, W. Va
Rumsey Mfg. Co., L. M., St. Louis.
Sanitary Earthenware Specialty Co., The Trenton, N. J.
Standard Sanitary Pottery Co., Elizabeth, N. J.
Trenton Potteries Co., The, Trenton, N. J

Sanitary Specialties.
National Brass & Metal Co., Minneapolis, Minn.

Screw Cutting Machinery.
Merrell Mfg. Co., Toledo, O.

Seats.
Herrmann Furniture & Plumbers' Cabinet Works, New York City.

Seat Attachments.
Rubenstein, N., New York.

Separator, Electro-Magnetic.
Capitol Brass Works, Detroit, Mich.

Separators, Steam and Oil.
Webster & Co., Warren, Camden, N. J.

Shades.
Frink, I. P., New York.

Sinks.
Alberene Stone Co., Chicago.
American Porcelain Co., New Brighton, Pa.
Central Foundry Co., New York.
Kilbourne & Jacobs Mfg. Co., The, Columbus, O.

Sinks, Solid Porcelain.
Perth Amboy Ceramic Co., Perth Amboy, N. J.

Sinks, Wrought Steel.
Kilbourne & Jacobs Mfg. Co., Columbus, Ohio.

Sleeves.
McCullough-Dalzell Crucible Co., Pittsburgh, Pa.

Soil Pipe and Fittings.
Central Foundry Co., New York.

Solder.
Blatchford & Co., E. W., Chicago.
Canada Metal Co., The, Toronto, Ont.
Lausten Lead Works, Chicago.
Raymond Lead Works, Chicago.
Fleck Bros. Co., Philadelphia.

Stalls, Closet and Urinal.
Alberene Stone Co., Chicago.

Stall Trimmings.
Speakman Supply & Pipe Co., Wilmington, Del.

Steamfitters' Supplies.
Beaton & Corbin Mfg. Co., The, Southington, Conn.
Crane Co., Chicago.
Davis Co., The John, Chicago.
Du Bois & Co., F. N., New York.
Malbin & Kammerman, New York.
Perkes, Charles, Philadelphia.
Simmons Co., John, New York.
Tay Co., Geo. H., San Francisco, Cal.
Urquhardt, Son & Co., J. S., New York.
Walworth Mfg. Co., Boston.

Steam Heating Systems.
Trane Vacuum Heating Co., James A., Chicago.
Webster & Co., Warren, Camden, N. J.

Steam Traps.
American Blower Co., Detroit, Mich.
Wright Mfg. Co., Detroit, Mich.

Steel Towers.
Caldwell Co., W. E., Louisville, Ky.

Stocks and Dies.
Boston Brass Co., Boston.
Oster Mfg. Co., The, Cleveland, O.
Reed Mfg. Co., Erie, Pa.
Saunders' Sons, D., Yonkers, N. Y.

Stop Cock Boxes.
Modern Iron Works, Quincy, Ill.

Stop Cocks.
Murray, John A., New York, N. Y.

Stoppers.
The McCullough-Dalzell Crucible Co., Pittsburg, Pa.

Tags, Shipping.
American Mfg. Co., Battle Creek, Mich.

Tanks.
Herrmann Furniture & Plumbers' Cabinet Works, New York City.
Monitor Steam Generator Co., Landisville, Pa.

Tanks, Expansion.
American Radiator Co., Chicago.
Koven & Bro., L. O., Jersey City, N. J.
Wood Mfg. Co., John, Conshohocken, Pa.

Tanks, Red Cypress.
Caldwell Co., W. E., Louisville, Ky.

Tanks, Water Closet.
Carey, R. E., New York.
Columbus Brass Co., The, Columbus, O.
Day Metallic Mfg. Co., New York.
Olmstead Co., H. B., New York.

Tapping Machines.
Hadesty & Son, J. M., Tamaqua, Pa.

Temperature Controllers.
Automatic Heating Co., Boston, Mass.

Testing Plugs.
New Jersey Plumbing Specialties Co., Hoboken, N. J.

Testing Valve and Plug.
Simmons Co., John, New York.

Thermometers, Hot Water.
American Steam Gauge & Valve Mfg. Co., Boston.

Traps and Bends.
Blatchford & Co., E. W., Chicago.
Cudell, F. E., Cleveland, O.
Detroit Sanitary Supply Co., Detroit, Mich.

Du Bois & Co., F. N., New York.
Ideal Mfg. Co., The, Detroit, Mich.
Lausten Lead Works, Chicago.
National Supply Co., The, Toledo, O.
Nelson Mfg. Co., N. O., St. Louis, Mo.
Raymond Lead Works, Chicago.
Sure Seal Trap Company, Inc., Providence, R. I.

Traps, Grease.

Barrett Mfg. Co., James, Boston.
Estabrook's Sons, R., South Boston, Mass.
Sproul & McGurrin, Grand Rapids, Mich.

Traps, Sewer, Gas and Back-Water.

Cudell, F. E., Cleveland, O.

Traps, Steam.

Houghton & Co., E. F., Chicago.
Monash-Younker Co., Chicago.

Traps, Tide Water and Sewer.

Barrett Mfg. Co., James, Boston.

Tray and Sink Legs.

Crawford Specialty Co., Boston.

French Braces.

Dunn Mnfg. Co., Pittsburg, Pa.

Tubing, Seamless Brass and Copper.

Benedict & Burnham Mfg. Co., Waterbury, Conn.

Turret Lathes.

Warner & Swasey Co., The, Cleveland, O.

Union Elbows.

Capitol Brass Works, Detroit, Mich.

Unions, Flange.

Dart Mfg. Co., E. M., Providence, R. I.
Jefferson Mfg. Co., Lexington, Mass.

Unions.

Dart Mfg. Co., E. M., Providence, R. I.
Jefferson Mfg. Co., Lexington, Mass.
Western Tube Co., Kewanee, Ill.

Vacuum Heating Systems.

Morgan & Co., Chicago.
Trane Vacuum Heating Co., James A., Chicago.
Vapor Heating Co., Philadelphia.

Valve Discs, Steam.

Bell, Andrew, Newark, N. J.

Valves.

American Steam Gauge & Valve Mfg Co., Boston.
Campbell Brass Works, J. B., Erie, Pa.
Clayton & Lambert Mfg. Co., Detroit, Mich.
Crane Co., Chicago.
Crosby Steam Gauge & Valve Co., Boston.
Davis Co., The John, Chicago.
Haya Mfg. Co., Erie, Pa.
Jenkins Bros., New York.
Kennedy Valve Mfg. Co., The, New York.
Kinsey & Mahler Co., Peoria, Ill.
Phelps Bros., New York.

Valves, Back Water.

Western Plumbing Supply Co., Chicago.

Valves, Cleanout.

Western Plumbing Supply Co., Chicago.

Valves, Gate.

Kennedy Valve Mfg. Co., The, New York.
Harvey's Sons' Mfg. Co., A., Detroit, Mich.
Sweet & Doyle, Cohoes, N. Y.
Simmons Co., John, New York.

Valves, Hopper.

Asbell Co., S. J., Paterson, N. J.

Valves, Hydraulic.

Nethery Hydraulic Valve Co., New York, N. Y.

Valves, Needle Point.

Clayton & Lambert Mfg. Co., Detroit, Mich.

Valves, Pump.

Jenkins Bros., New York.

Valves, Radiator.

Penn Engineering Co., The, Philadelphia.
Western Tube Co., Kewanee, Ill.

Valves, Radiator, Air.

Monash-Younker Co., Chicago.
Morgan & Co., Chicago.
Peerless Heater & Valve Co., Detroit, Michigan.
Penn Engineering Co., The, Philadelphia.
Phelps Bros., New York.
Smith Co., The H. B., Westfield, Mass.
Simmons Co., John, New York.

Valves, Regulating.

Monash-Younker Co., Chicago.

Valves, Tank.

Boston Brass Co., Boston.

Vapor Heating System.

Vapor Heating Co., Philadelphia.

Ventilators, Closet.

Scully Mfg. Co., W. J., Detroit, Mich.

Ventilating Apparatus.

Lord & Burnham Co., Irvington-on-Hudson, N. Y.

Ventilators, Closet and Urinal.

Simplex Ventilator Co., Ltd., Detroit, Mich.

Vises, Pipe.

Armstrong Mfg. Co., Bridgeport, Conn.
Hollands Mfg. Co., Erie, Pa.
Curtis & Curtis Co., Bridgeport, Conn.
Parker Co., Charles, Meriden, Conn.
Reed Mfg. Co., Erie, Pa.
Walworth Mfg. Co., Boston.
Saunders Sons, D., Yonkers, N. Y.

Wall Reels and Racks.

Wirt & Knox Mfg. Co., Philadelphia, Pa.

Wash Basins.

Kelly & Bros., Thomas, Chicago.

Washers.

Bell, Andrew, Newark, N. J.

Washtrays, Solid Porcelain.

Perth Amboy Ceramic Co., Perth Amboy, N. J.

Wash Tub Covers, Galvanized Iron.

Greason Mfg. Co., New York, N. Y.

Water Closet Combinations.

Fleck Bros. Co., Philadelphia.
Froelich Bros., Philadelphia, Pa.
Great Western Pottery Co., Kokomo, Ind.
Ideal Mfg. Co., Detroit, Mich.
Kelly & Bros., Thomas, Chicago.
Knapp Supply Co., Union City, Ind.
Nelson Mfg. Co., N. O., St. Louis.
Olmstead Co., H. B., New York.
Robertson Mfg. Co., James, Baltimore, Md.
Rumsey Mfg. Co., L. M., St. Louis, Mo.
Sanitary Specialty Mfg. Co., Chicago.
Standard Sanitary Mfg. Co., Pittsburg.

Water Closets, Frost Proof.

Walls & Pearsall, Philadelphia.

Water Closets, Porcelain.

Trenton Potteries Co., The, Trenton, N. J.

Water Heaters.

Crane, Wm. M., Co., New York City.

Water Heaters for Barber Shops.

Ransom & Randolph Co., The, Toledo, O.

Water Heaters, Instantaneous.

Crane Co., Wm. M., New York.
Humphrey Mfg. & Plating Co., Kalamazoo, Mich.
Lawson Mfg. Co., Homestead, Pa.
Monarch Water Heater Co., Pittsburg.
Ransom & Randolph Co., The, Toledo, O.

Water Heaters, Laundry.

Knight & Jillson Co., Indianapolis, Ind.

Water Heaters, Range Boiler.

Adam, W. J., Joliet, Ill.
Humphrey Mfg. & Plating Co., Kalamazoo, Mich.

Water Lifts.

Ohio Pump & Brass Co., The, Columbus, O.

Water Supply Systems.

Kewanee Pneumatic Water Supply Co., Kewanee, Ill.

Wiping Cloth.

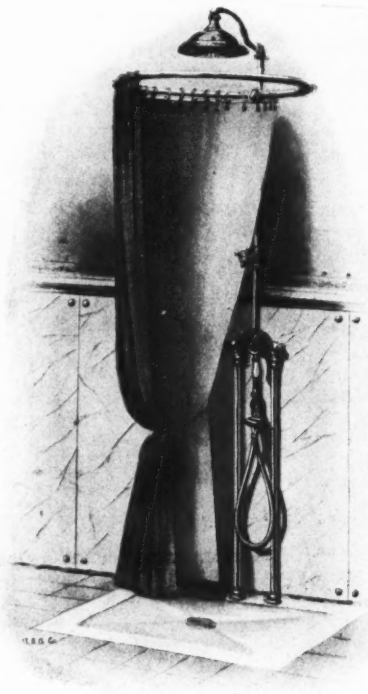
Union Supply Co., Dundee, Ill.

Wire Brushes.

Brackett & Flint, Boston.

Wrenches, Pipe.

Hollands Mfg. Co., Erie, Pa.
Reed Mfg. Co., Erie, Pa.
Trimont Mfg. Co., Roxbury, Mass.
Walworth Mfg. Co., Boston.



With or Without Douche Valve.

SODERLUND

NON-SCALDING

SHOWER

OPERATED BY ONE HANDLE

For Gymnasiums, Colleges, Hospitals, Asylums, Public and Private Institutions.

SAVES TIME AND MONEY

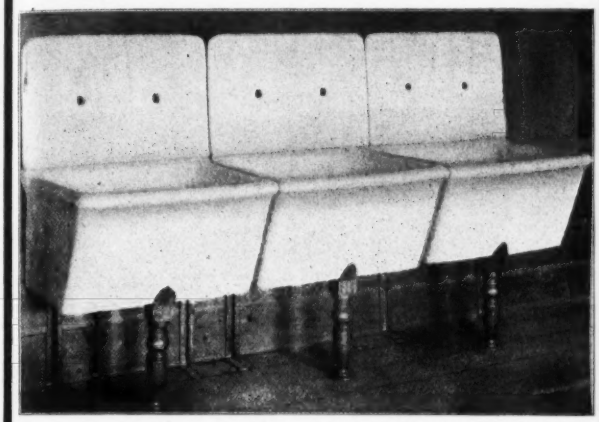
Our Shower Valve is made so that the **Supplies** may enter the **top, bottom** or **back** of Fixture as the case may require, for Ceiling, Floor or Wall connections.

Let us quote you prices on Complete Showers or Valves only. We know they will please you.

These goods made solely by us
For Sale by Leading Jobbers of Plumbers' Supplies.

Complete catalogue of Soderlund Fixtures for Lavatories, Bath-Tubs and Shower Baths, may be had for the asking.

Union Brass Works Co., Charlestown, Mass.



Solid Porcelain Laundry Tubs

Made by the

American Porcelain Company

NEW BRIGHTON, PA.

Makers of the well known "Perfection" solid porcelain flat and roll-rim laundry tubs, kitchen and pantry sinks, lavatories, etc.

McShane's Automatic Low-Down Combination

It's Sanitary
It Works Perfectly
There's Money in it

We Cater to the Jobber Only

Correspondence Invited

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DART PATENT UNIONS AND FLANGES. ADAPTED FOR USE IN ALL WROUGHT IRON THREADED PIPING.

Chicago Sales Agents, Western Valve Co., 43 West Randolph Street.

VACUUM STEAM HEATING

NO AIR LINES. NO PUMP. NO SEAL.

THE "ALLEN"

Automatic Air and Vacuum Valve

DOES IT ALL

LET US TELL YOU ABOUT IT

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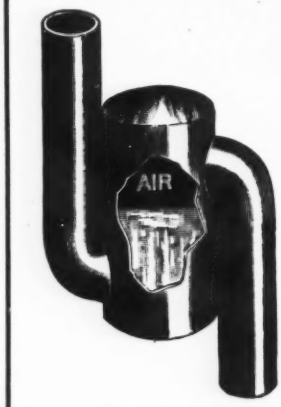
40 Dearborn Street, Chicago



A Little Jingle Well Worth Reading.

Said he, it seems to me this is a very interesting case,
And might teach a lesson to the busy human race.
Fine feathers make fine birds among the songsters of the woods,
And Clean Sweep Traps and Fuller Work are the feathers on the goods.
If you have a dandy line, the goods, too, must be fine,
You will do yourself great justice by a purchase superfine.
Therefore kindly heed the proverb, in this, our little rhyme,
Use Clean Sweep Traps, the Fuller Work is of the noiseless kind.

Traps sold in England, Germany, Norway, Canada and the United States.

Detroit Sanitary Supply Company

Sole Manufacturers

27-29 Jefferson Avenue DETROIT, MICH.

FARNAN
STOP AND WASTES
FARNAN
INVERTED KEY COCKS
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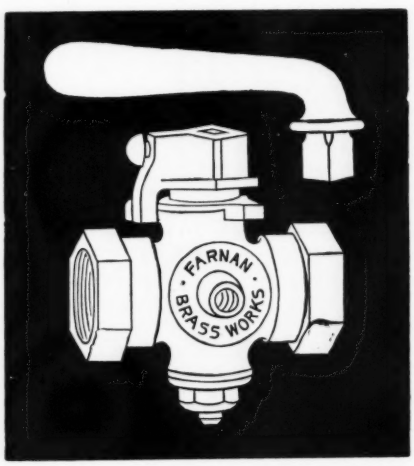
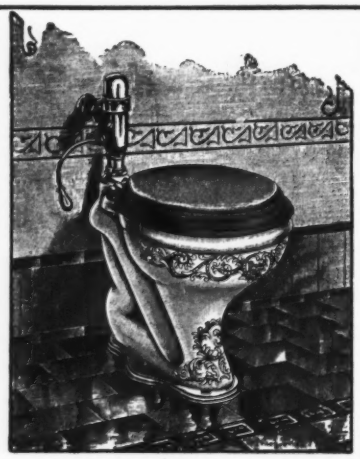
STEAM COCKS
FARNAN
ACID METAL COCKS
ALL SIZES



HURRY
ORDERS
MAIL
ORDERS
ALL
ORDERS
GET QUICK ATTENTION

FARNAN
BRASS WORKS
CLEVELAND, : : OHIO



PATENT APPLIED FOR

Fig. E. 99. ANGLO. Lever action.

IT WILL PAY YOU TO DROP US A LINE FOR OUR CIRCULARS AND PRICES OF

The Watrous

"AQUAMETER"

It is a self-measuring flush valve for water closets and urinals, automatically measuring the water for each flush. No more ball cocks, individual tanks or flush pipes needed, as it may be attached direct to pipe from city main or storage tank. Made in two styles, **lever action and seat action.** The WATROUS "AQUAMETER" is in use in many of the best buildings throughout the country, giving perfect satisfaction in all cases. We would be pleased to refer you to same on application. We use no cup washers in the construction of this valve. Manufactured and for sale by

FEDERAL COMPANY

231-237 Washington Street CHICAGO, ILL.

We protect all users of our goods against infringement suits.

MINUTES COUNT

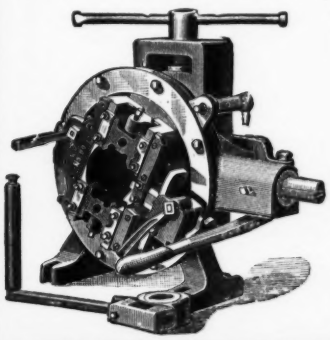
When you have a "Rush" Job on hand 'tis then the virtues of

ARMSTRONG'S

WATER, STEAM AND GAS FITTERS

TOOLS

make themselves apparent.



They are made especially for Time and Labor—Saving and for Extensive Wear.

ARMSTRONG PIPE THREADING and CUTTING OFF MACHINES HAND or POWER capacity from 1-4 in. to 6 in.

PIPE WRENCHES VISES

GENUINE

ARMSTRONG STOCKS and DIES

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THE ARMSTRONG MFG CO

BRIDGEPORT, CONN., U.S.A.

NEW YORK 139 CENTRE ST.

HERE IS JUST WHAT YOU WANT

A GALVANIZED RANGE BOILER

Guaranteed

TO STAND **300** LBS. PRESSURE

for 6 years

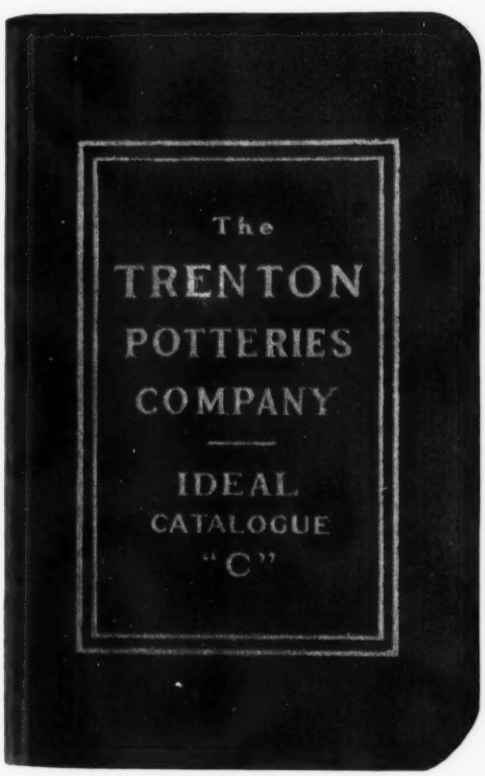
MADE BY

John Trageser Steam Copper Works

ESTABLISHED 1850

447-457 West 26th Street, New York

WRITE FOR GRAVES BOILER CATALOGUE. MANUFACTURERS OF TANKS FOR HOT WATER SUPPLY, WITH OR WITHOUT COILS.



ACTUAL SIZE

Illustrated Catalogue

and

Price List

Of Ideal Bath Tubs, Lavatories, Sinks, Laundry Trays etc., etc.

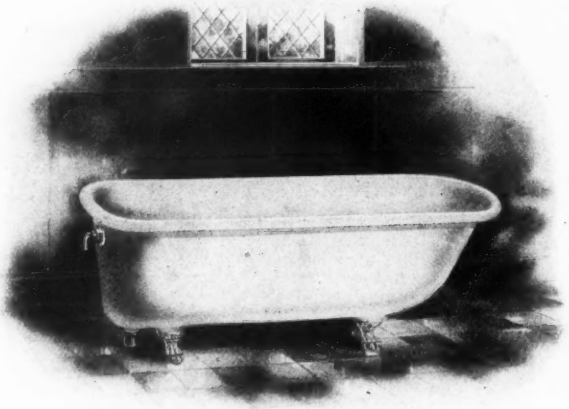
Copy will be sent on application

The Trenton Potteries Company

Trenton, New Jersey

Complete Line of

Cast Iron Enameled Ware



Write for Catalog.
Our Enameled Ware is fully guaranteed.
Write for prices on Plumbers' Brass Goods.

The Humphryes Mfg. Co., - Mansfield, Ohio

The Climax Ratchet Stock

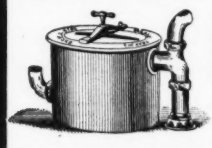
Is an indispensable tool for conveniently threading iron pipe in ditches, under floors, in corners, overhead, etc. With this tool threads can be cut without removing whole lengths of pipe. This tool is provided with a strong vise which securely grips the pipe, and by means of the leading thread the die is forced on pipe and the thread is cut. It is made of malleable iron and steel, and, while light in weight, making it convenient to carry, is very strong and rigid. The advantages of this tool make it absolutely indispensable to Plumbers, Steam and Gas Pipe Fitters, Gas and Water Companies, Machinists, etc. It takes standard size dies, which are extra if furnished.

No. 1 threads ¼ to 1 inch pipe, takes die 2 and 2½ inches square.....$10.00
No. 2 threads 1 to 2 inch pipe, takes die 2½, 3 and 4 inches square $17.00

For sale by leading jobbers.

MANUFACTURED SOLELY BY
C. M. KEMP MFG. CO.
BALTIMORE.

EXCELSIOR
GREASE TRAP



Well and favorably known; two sizes for hotels and restaurants and residences. Get list price and trade discounts.

SPROUL & McGURRIN
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NAUGATUCK SEAMLESS
GUARANTEED FOR ONE YEAR
FOR RECEIVERS STEAM TRAPS REGULATORS ETC.
TESTED TO 300 LBS.
COPPER BALL FLOATS
NAUGATUCK MFG. CO. NAUGATUCK, CONN.

Built on Honor

HIGH CLASS ENAMELED WARE

Eureka Tub

Prices will interest you

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Write Today **McVay & Walker** Braddock, Pa.

Sisson Insertable Joint
Indispensable to Plumbers
A friend in need is a friend indeed.

THE S. I. J.
FOR SOIL PIPE
Sizes 2 to 6 inches.
Light and Heavy.
Makes a neat job and saves your patience.
ASK YOUR JOBBERS FOR IT

This does the trick.

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R. ESTABROOK'S SONS
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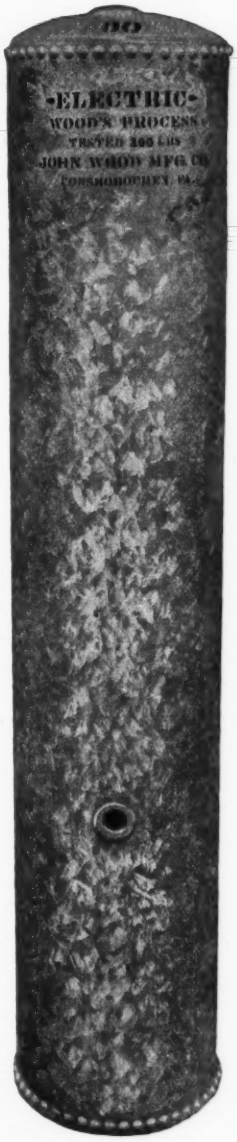
Guaranteed

Unconditionally

Electric Weld Range Boilers



Will Test Stronger than any Boiler on the Market

Are welded better than a steam boiler tube Head and bottom are shrunk in place for riveting

THEY REPRESENT THE FINE ART OF BOILER CONSTRUCTION

John Wood Mfg. Co.

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A FEW GOOD ONES

The Standard Oil Co.
Southern Cotton Oil Co.
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These are a few of the thousands of users of the MARCK Steam Trap.

How many large concerns are there in your vicinity for whom you have never done any work. Now suppose you go to them and make an offer to demonstrate to them that you can effect a large saving in fuel by installing the MARCK Steam Trap, don't you think that it will lead to further business besides the mere profit on the trap? We mean, of course, providing the traps will do as you gaurantee them to do. Now suppose they do not? Back they come to us for we do not ask a single cent till they have been tried for 30 days. Suppose they give out or get out of order in a short time, (which they will not) we have to make them good for we guarantee the traps for two years. Now there is no risk on your part and this is the secret of making trade. Get in on a good thing that will make a showing and regular trade will follow. That is the experience of all steam fitters and architects who have been recommending the MARCK Trap.

A small apparatus; simple in construction; low in price; easy to comprehend; only one moveable part. Send for a catalogue and full information.

Be certain to state that you want a trap catalogue, for we issue many catalogues, most of which would not interest the steam fitter.

E. F. HOUGHTON & CO.

243 West Somerset Street
PHILADELPHIA

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TIDEWATER AND SEWER TRAP

BARRETT SPECIALTIES

TIDEWATER AND SEWER TRAPS,
O. D. BACK WATER VALVES,
CLEANOUTS, GREASE TRAPS.

BARRETT SPECIAL FITTINGS
BRASS RAILING, IN ANY FINISH.

JAMES BARRETT MFG. CO.

MANUFACTURERS AND
WHOLESALE DEALERS IN PLUMBERS' SUPPLIES.

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209-211 FRANKLIN STREET

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Lausten Lead Works

PRATT AND MORGAN STREETS
CHICAGO

Bi-metallic specialties
Lead traps and bends

Write for prices

Lead pipe, sheet lead
Ebony gloss plumbers' soil

THE BEST ON THE MARKET

Bent Wood Seat. Patented.

COLUMBUS BRASS COMPANY

We manufacture the only bent wood seat on the market. GUARANTEED AGAINST SPLITTING—if it does—RETURN AND WE WILL REPLACE IT. The seat carries a patented adjustable hinge—to fit washdown or syphon jet bowl.

COLUMBUS BRASS COMPANY, COLUMBUS, OHIO

APPROVED BY DEPARTMENT OF THE CITY OF NEW YORK

The N. R. (Pat.) Seat Attachment

The N. R. (Pat.) Seat Attachment, is a combination of Clamp, Arm and Hinge which clamps bowl to trap and at the same time fastens seat to bowl, thus making it possible to use the Short and Oval Hopper Closet, for open plumbing in place of the washout closet which is much more expensive, and which easily gets out of order.

This attachment does away with all wood and Carpenter work, eliminates the drip tray and makes possible a neat and quick job.

Write for Territory Agency **PRICE $4.00 A SET** Liberal Discount to the Trade

If your supply house cannot supply you, please write direct to:

Manufacturer and Patentee

Nathan Rubenstein, 552 Grand St., New York

THE NO. 10 COIL FIRE POT

Will please users who like coil fire pots. *The tank is made of heavy galvanized iron* which is much stronger and more durable than tin. *The valves are fitted with needle points* which give the user better control of the fire and add to the life of the fire pot. We are so confident that it will suit that we say to you, "*Your money back if you are not pleased.*" Ask your jobber for it. He will supply at factory price, or we will ship direct if you choose.

$3.00 NET.

Clayton & Lambert Mfg. Co., Detroit, Mich.

Malleable and Wrought Pipe Hooks and Straps

Complete stock of every size and kind. Quality the best that can be made. B.B. Ornamental Pipe Straps, all even, clean cut, brightly tinned. Ask for catalogue and prices.

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WIRE STRUNG TAGS A SPECIALTY

THE AMERICAN MFG COMPANY. BATTLE CREEK, MICH. MANUFACTURERS OF SHIPPING TAGS.

STRONGEST SHIPPING TAGS IN MARKET

SMOOTH-ON JOINTS

TRADE MARK

A silicated Iron Cement for connecting Bell and Spigot Cast-Iron Soil Pipe in place of Lead, Joints are easily and quickly made. Sold in 5, 10 and 25 lb. red labeled tins.

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will repair leaky boilers, piping etc., it will withstand fire, water, steam and oil, it expands and contracts the same as iron. Sold in 5, 10 and 25 lb. blue labeled tins.

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Are you stuck?

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Plumbing Problems; or Questions, Answers and Descriptions.— From the Sanitary Engineer, with one Hundred and Forty-two illustrations. Putting in a convenient form for reference a selection of questions and comments on various problems met with in house drainage and plumbing, improper work being illustrated and explained as well as correct methods, making this a useful book to those interested in this branch of sanitary engineering. Among the various points on the subject illustrated and described are Dangerous Blunders in Plumbing, House Drainage, Hot-Water Circulation in buildings, Hot-Water Supply in Various Buildings, and a host of miscellaneous facts and data pertaining to plumbing, and useful alike to plumber and householder. Large 8vo. Cloth. **$2.00**
Sent postpaid on receipt of price.

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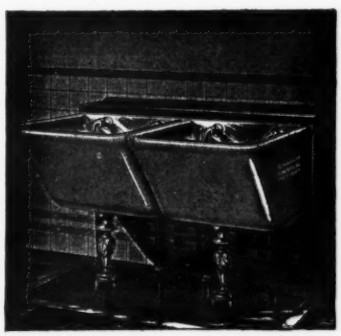
CHICAGO, ILL.



Good Goods Only at Factory Prices.....

Good buyers want to know what that means. They may learn by asking for a catalogue of our imperishable Sanitary Laundry Trays and Sinks.

Chas. Graham Chemical Pottery Works

986-1018 Metropolitan Avenue,
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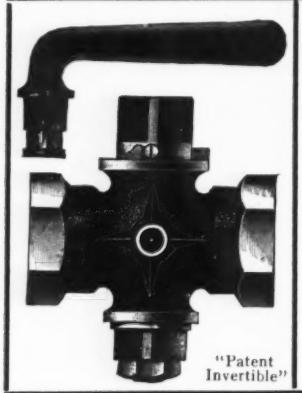
MORGAN'S VACUUM SYSTEM.

CHICAGO.

Adapted to any tight boiler. Requires no pump. Dampers controlled by temperature of the vapor in boiler. Air from radiators emitted in basement. No air valves required; this system is perfect. If, however, it is not convenient to run air pipe, good results can be had by using

MORGAN'S XX CENTURY VACUUM VALVE. 38 DEARBORN STREET, CHICAGO.


"Patent Invertible"

Here is a Stop and Waste Cock that may be used in any position.

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J. B. CAMPBELL BRASS WORKS.

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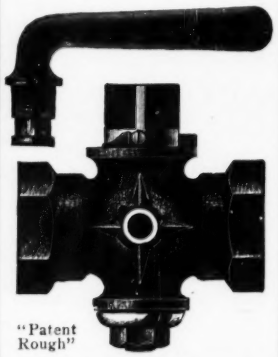
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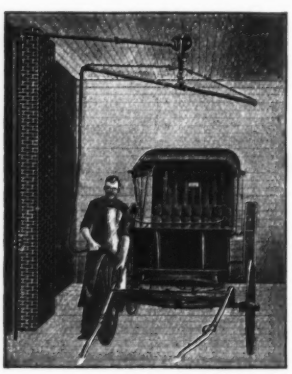

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by Installing the

BUTTS' BUGGY WASHER

In that stable you are PLUMBING

Send for Circulars and Prices

Manufactured by

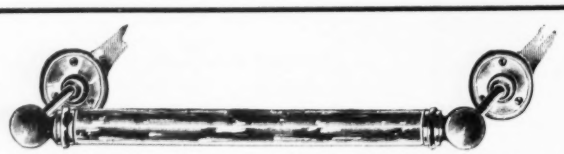
Nolan & Blen

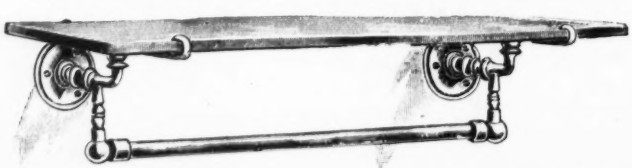
59 Cambridge Street, Boston, Mass.

Here It Is!

If you are interested in heating of any kind we will mail you a catalog "Y" of the Vapor system.

Vapor Heating Co.
917 Arch Street,
Philadelphia, Pa.


Nickel Plated Towel Rack No. 5041. Size of bar 1 inch, with 2½ inch wall plate.


Crystal Glass Towel Shelf No. 5037, fitted with 1 inch solid glass bar.

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Bath Room Furnishings

are shown in our Catalogue No. 19. Just out—Have you received a copy? If not write us for one.

Everything in Bath Room Furnishings

Manufactured by

S. Sternau & Company

204 CHURCH STREET CORNER THOMAS, NEW YORK
FACTORY: BROOKLYN, N. Y.

Jobbers Attention

We are making a leader on these.
This means a price that is right.

Number 4½ N. P. Fuller Bath Cock with Our Ball Pattern Offset Supply Pipes. Pipes ⅜ in. OD No. 14 gauge, full ½ in. IPS, thread cut on each end of pipes. Good Bath Cocks, Good Ball Pattern Offset, Good Pipes.

ARE YOU IN THE MARKET FOR A STOCK ORDER?
IF SO, DON'T FAIL TO GET OUR PRICE.

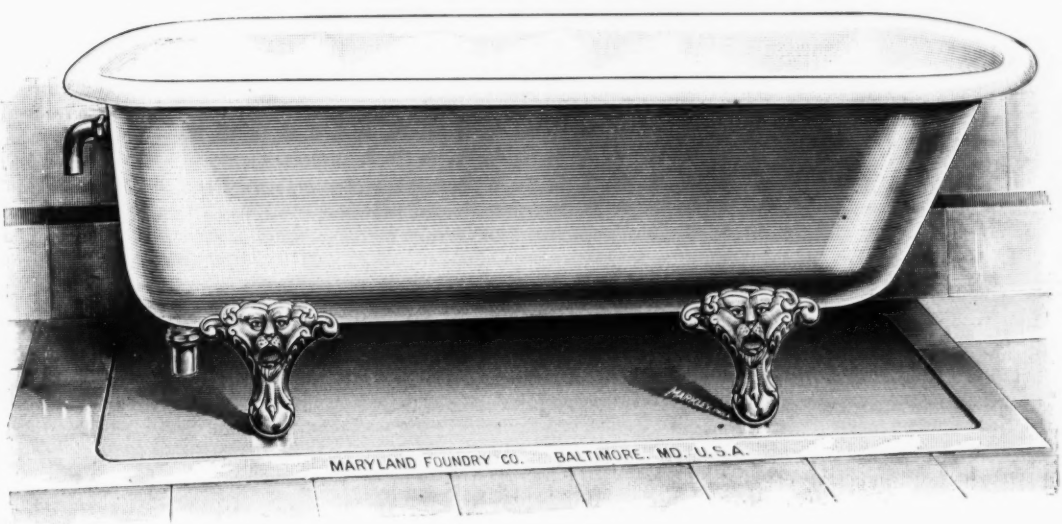
Street & Kent Mfg. Company

Manufacturers of Plumbers' Brass Work

43-45 Fulton Street, Chicago, Illinois. New York Office, 81 Fulton Street.

Princess 3 Inch Full Roll Rim Enameled Iron Baths

An elegantly proportioned Flat Bottom Bath



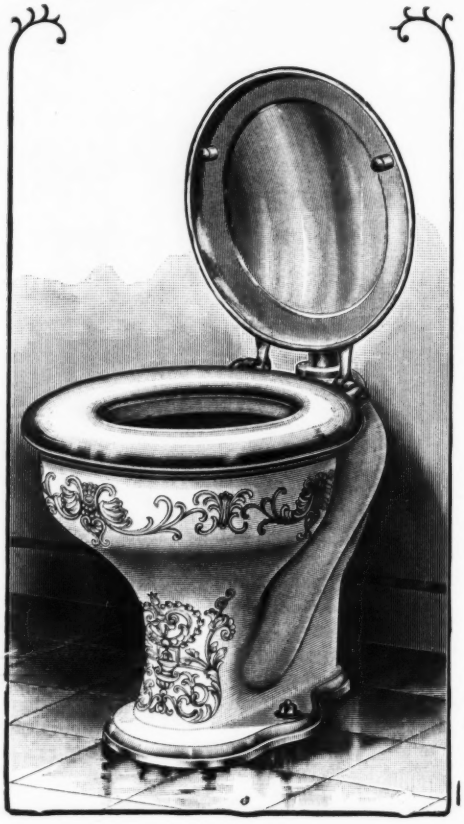
We manufacture a full and complete line of Enameled Baths, Lavatories, Sinks, etc., etc. Inquiries solicited.

A. Weiskittel & Son, Baltimore, Maryland, U. S. A.

INDEPENDENT OF ALL TRUSTS AND COMBINES

The Improved Hygienic Seat

The latest, best and only sanitary Seat on the Market.



The proper Seat to use in all public and private buildings.

The seat and cover are each single pieces of steel stamped under heavy pressure into proper shape, and connected by malleable hinges which are riveted to both seat and cover. These seats are enameled in white making them marvels of beauty.

The undersurface of the Hygienic Seat is concave, making the inner edge form a drip so that any accumulated moisture drops into the bowl and prevents the formation of the black and filthy surface usually found on the undersurface of wood seats. One of the first impressions conveyed to the mind when this seat is presented is that it must be cold and disagreeable. Practical tests, however, have demonstrated beyond a doubt that in this respect they are in no wise different from wood seats. It is perfectly hygienic as its name implies, because it is absolutely moisture proof. Being made of steel and coated with a water-proof white enamel baked on it, it is non-absorbent. It will not split and it has no creases or corners that cannot be wiped off easily the same as earthenware. The enamel is not injured by the washing or scrubbing that removes the varnish from the wood seat.

Orders filled promptly. Prices and further particulars on application.

THE HYGIENIC SEAT COMPANY

139 BEAUBIEN STREET **DETROIT, MICH., U. S. A.**

REASONS Why Plumbers Should Buy Our Supplies

GOODS SHIPPED PROMPTLY.

WHEN you are in a hurry it is most aggravating to have your orders delayed by small stocks, mixed invoices or unaccommodating shippers. The non-arrival of goods, which you have every reason to expect upon a certain date, often means a considerable pecuniary loss to you. None of these troubles will happen when you do business with us. We carry an enormous stock of goods and can ship your order promptly, whether a few items or a carload. All orders shipped promptly. Every shipment is examined and checked by three different parties before being sent forward. We realize that time is as valuable to you as it is to us, and we make a special effort to be prompt and correct. Your assurance of satisfaction with us simply requires the telling of what you want.

"We Have It"

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Office & Store 44-50 N. 5th St. **Lead Works & Warehouse** 1641-45 American St.

The Roman Bibb has only four parts, a full flow of water can be secured with only one turn of the handle, and it is the only bibb which will not cause the water to spatter. A sample bibb will be sent by mail on 30 days' trial and if you don't think it the best bibb you ever saw it can be returned at our expense.

COLONIAL COMBINATION

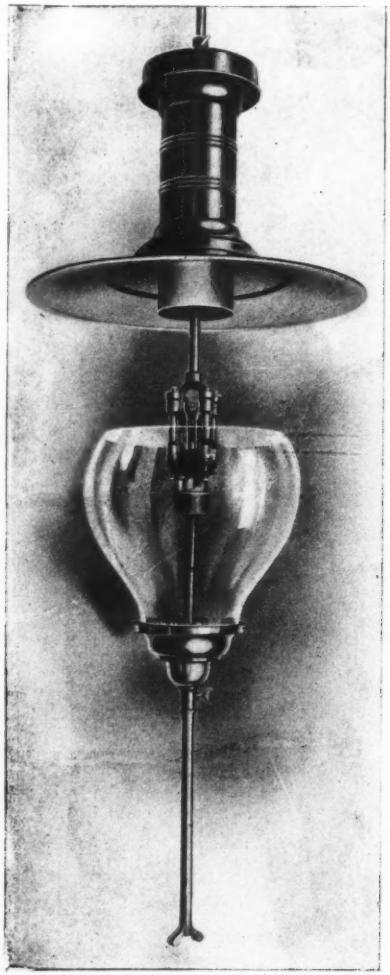
Vitreous syphon jet shaped seat and lid, Colonial tank 10 oz. copper compound lever ball cock. Write for Prices.

THE

Eagle No. 14 Gas Arc Lamp

FOR OUTDOOR LIGHTING

Without doubt the finest arc ever placed before your notice.



A SYNOPSIS OF ITS LEADING FEATURES IN A NUTSHELL.

The safest and smallest consuming pilot light.

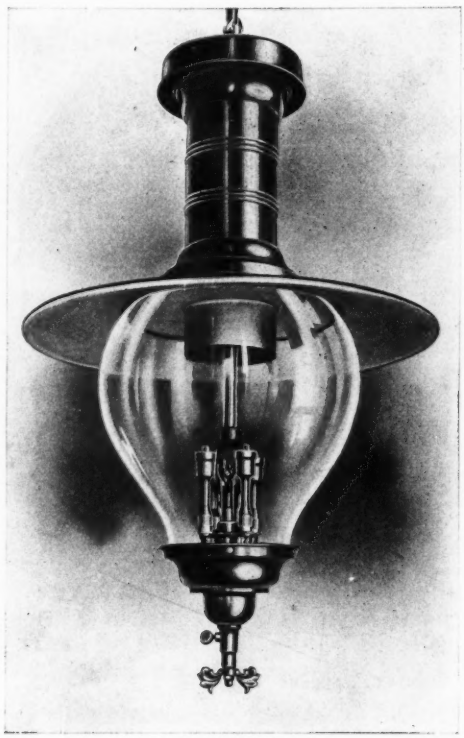
An adjustable centre support fastener.

Fitted with the most efficient and durable burners embodying the needle screw regulator.

No chains, no cocks, no pulling or jerking, nothing to become clogged or tight from residue dirt or heat.

A piece of mechanism which revolutionizes previous constructions of cluster lights.

The simple and safe way in which mantles are replaced and the globe removed for cleaning, will appeal to you at a glance.



MANUFACTURED BY

THE S. BERNSTEIN COMPANY

126-130 Sixth Avenue New York

Our book is rather interesting reading for any Trade Paper Advertiser.

—because "THE INDIVIDUAL ADVERTISING DEPARTMENT" tells of a lot of things which the man who spends his appropriation through an Adverting Agent will never learn except, perhaps, by accident or from experience.

The book explains a number of different "plans" which can be worked either with or without Trade Paper advertising.

It also tells of many of the methods and "schemes" which cost a pile of money without paying any profit—except to the man who sells them.

A dollar a copy—with the dollar-back-on-request option.

"Your book "The Individual Advertising Department" contains much matter which leads to advantageous thought. Do not think any one interested in advertising will regret spending a dollar for it." (Name sent on request.)

Trade Paper advertising will only pull inquiries and show a profit on the investment, when the right mediums are used—and the ads are attractively displayed and sensibly written—and the business is advertised along business-like lines.

No matter how good the medium may be, the space alone won't make Trade Paper Advertising pay—unless the appropriation is a good deal bigger than the business can afford.

There are comparatively few Trade Papers worth using anyway—just a few in each line—the others simply bluff the Advertiser who doesn't know the game, or recognize the bluff.

We are ready to show any Trade Paper Advertiser how he can improve his methods and get better results for the same, or even less money than he is now spending.

We neither buy nor sell advertising "space", and are not connected with, nor interested in any method, medium or advertising agency—so we gain nothing by advising some particular medium or method, except the increased business which comes from a satisfied customer.

We determine just which of the many "methods" and "mediums" will be of greatest value for each particular customer, instead of trying to make a single plan fit every case as is usual with the Advertising Agency.

We take full charge of the Advertising Department, or we help one of the customer's promising employees to develop himself as the customer's prospective Advertising Manager.

We prepare the plan, select the mediums to be used, write all the copy needed, design all the ads and printed matter, and execute the campaign complete—or we turn the "plan and copy" over to the customer to execute.

Our services are sold and rendered on the terms and in the way which best suits each customer.

There is no theorizing or experimenting—we passed that stage quite a few years ago.

Our introductory booklet, "THE INSTALMENT ADVERTISING SERVICE", is free upon request—but a Firm Member or the Business Manager must make it.

Nearly 900 customers now.

Perhaps we might be able to add your name, if you knew more about us.

"Please ask questions."

The Whitman Company

Suite 602 Morton Building

New York

Another New Addition to our "High Grade" Line

"PARAGON"

PATENT

Ground Key Work

Patented February 7th, 1899. OTHER PATENTS PENDING

FULL WATERWAY

ABSOLUTELY DUSTPROOF

GRINDING THE BEST

FULLY GUARANTEED

Weight Exceeded By None

The Very Best of Metal

New Features Adding Greatly To Strength

Tested to 200 Lbs.

As will be observed, the manner of fitting the cap on the body instead of the plug is a new feature. This insures greater bearing surface, consequently much more strength. Our cap is absolutely dust-proof. No open holes or slots being necessary.

OUR GUARANTEE

The trade knows our reputation as manufacturers of "High Grade" goods. We can't afford to put a new article on the market that is inferior. We know our PATENT "PARAGON" GROUND KEY WORK has advantages over other makes, and possesses none of their defects, and it is with the greatest confidence that we introduce this new line to the trade, guaranteeing every piece of goods to be strictly first-class in every respect.

The Sanitary Company

Manufacturers of "Paragon" Plumbers' Brass Goods

1-9 Water Street, CLEVELAND, OHIO

"Standard"

in Quality, Design and Durability

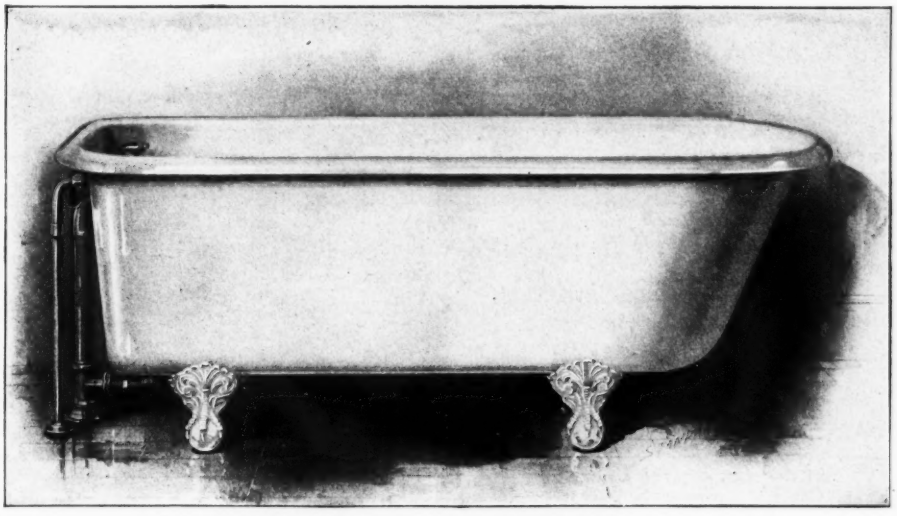


Plate No. 101 G.---THE OCCIDENT.

"Standard" Baths possess all the good points necessary to a bath tub of highest quality, having a hard, smooth and absolutely non-porous surface free from cracks and spotty discolorations. These qualities are found only in "Standard" Baths, which are the best in the world and cost no more than bath tubs of ordinary make.

Together with these excelling features "Standard" Baths, every one of which bears our "Green and Gold" label which is our absolute guarantee of quality and durability, are made known to prospective home builders by the Educational Advertising Campaign which we are conducting in all the leading magazines.

Display "Standard" Baths in your show room and write us for pamphlets to distribute in order to benefit by our advertising.

STANDARD SANITARY MANUFACTURING CO.

PITTSBURGH, PA., U. S. A.

L. M. Rumsey Mfg. Company

St. Louis, Mo.

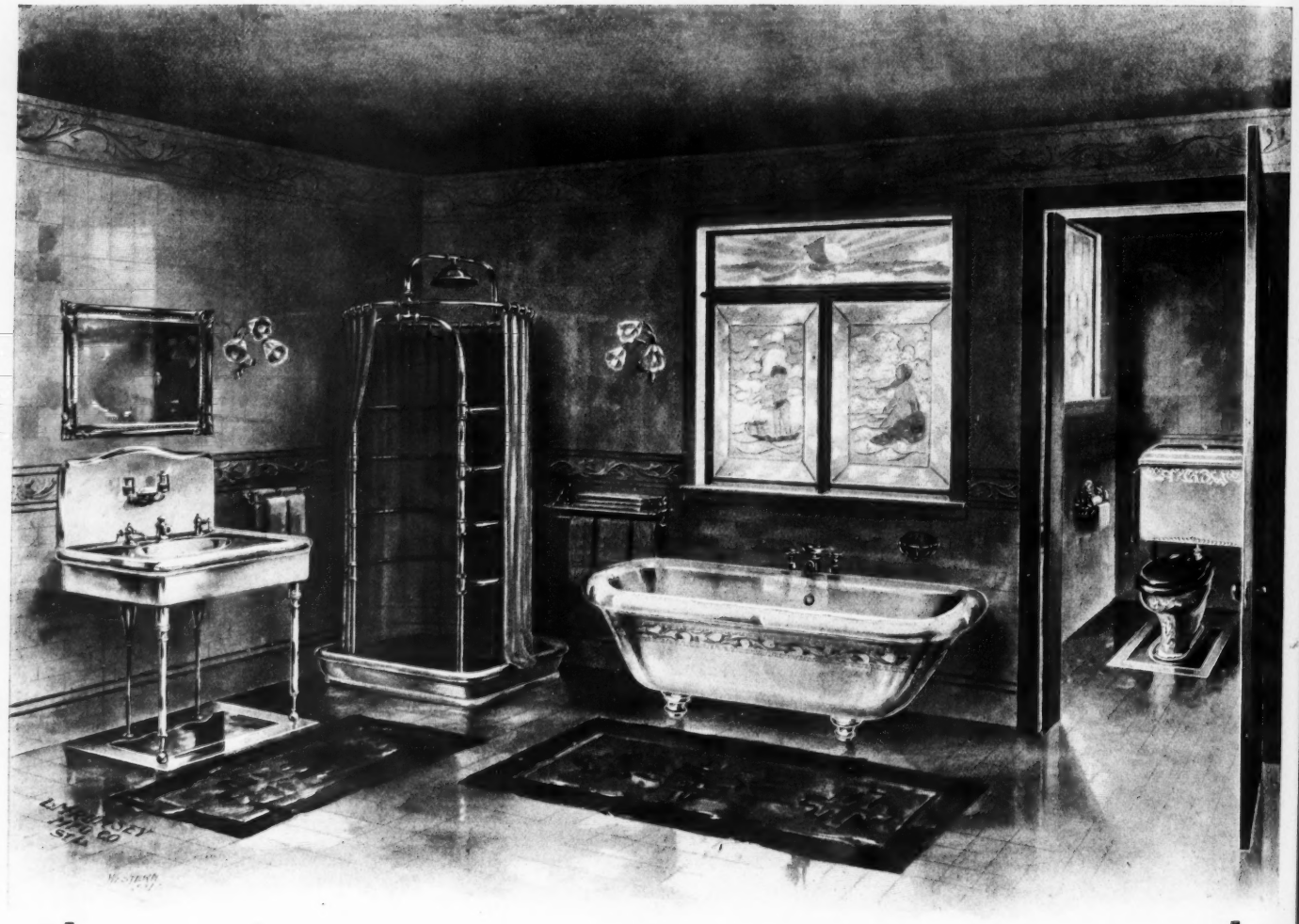


PLATE I G.

RUMSEY'S "TRI-SEAL" BATH ROOM COMBINATION

COMPRISING

BATH.—"Tri-Seal" Solid Porcelain Roll Rim Bath Tub, 5½ feet long, Class "A", glazed inside and over Rim, exterior finished Zinc White with "Tri-Seal" Decoration, four glazed Porcelain Legs, Nickel-Plated Low Bell Supply Fitting with Supply Pipes and "Superior" Waste.

NEEDLE AND SHOWER BATH.—Nickel-Plated Brass Combination Needle and Shower Bath with Rubber Lined White Curtain and Solid Porcelain Receptacle, 42 inches square outside.

WATER CLOSET.—Oval Embossed "Bonita" Syphon Jet Closet (Vitreous Ware) with Mahogany Seat and Cover and Embossed Low-Down Porcelain Syphon Tank with Porcelain Pull. Decoration on Closet and Tank.

LAVATORY.—Solid Porcelain Roll Rim Lavatory, 30x22 inches with 15-inch Back, Oval Basin 13x16½ inches inside, Nickel-Plated Faucets, Nickel-Plated Supply Pipes and Legs, Nickel-Plated Soap, Tumbler and Brush Holders, and 24x28-inch Plate Glass Mirror with Nickel-Plated Brass Frame.

THE JAMES ROBERTSON
MANUFACTURING COMPANY

Supplies and Tools for Plumbers Gas and Steam Fitters

OFFICE AND STORE, 30 HANOVER STREET,
FACTORY, 827 SOUTH HOWARD STREET, **Baltimore**

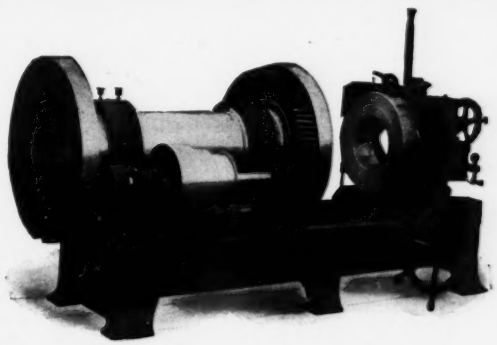
MANUFACTURERS OF
Lead Traps, Lead Bends, Lead Pipe, Sheet Lead, Block Tin Pipe, Lead & Iron Ferrules. Enameled Bath Tubs, Lavatories, Fine Brass Work, Sanitary Water Closets, Tanks, Seats, etc.

If you want a 12 inch Machine

to use any time in the near future you had better order it now. We have had a regular land slide of orders since the first of the year and are "chock full of business".

There must be some reason for our getting all these orders. If you have used our machines you know what it is—if you haven't we will be glad to tell you the reason. Don't put it off!

Bignall & Keeler Mfg. Co., Edwardsville, Ill.



CAST IRON SOIL PIPE. CAST IRON WATER PIPE

PLUMBERS' SUPPLIES AND LEAD PIPE.

"UTICA PIPE IS THE BEST."

Charles Millar & Son Co.,
Selling Agents, UTICA, N. Y.

"The Cast Sink Must Go"

"Columbus" & "New Era"

Wrought Steel Sinks.

ROLLED RIM AND FLAT EDGES.

Painted, Galvanized, Blue Enameled,
Grey Enameled, White Enameled.

Write for Catalogue and Prices...

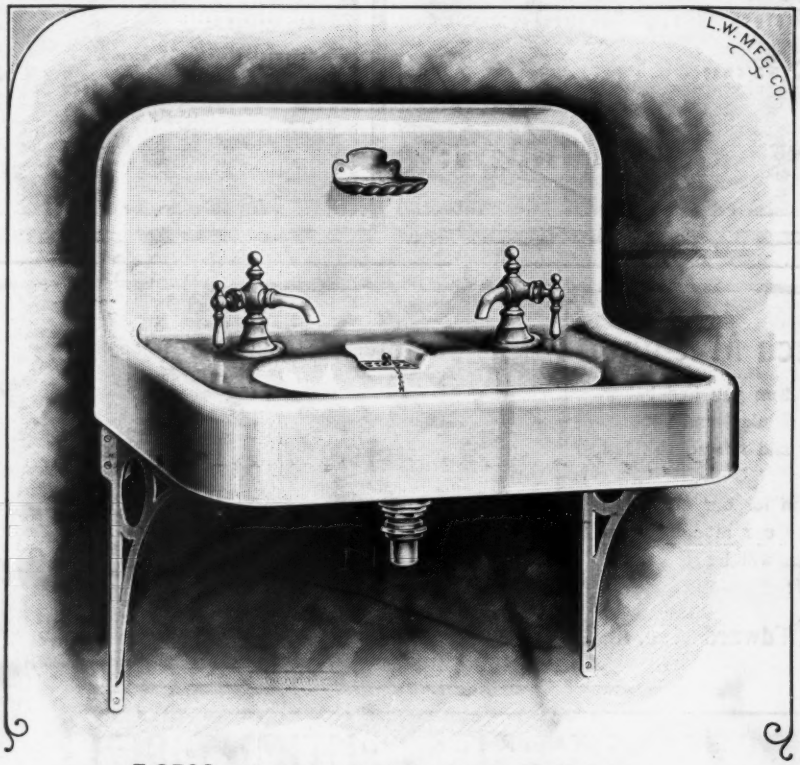
The Kilbourne & Jacobs Mfg. Co.,
COLUMBUS, OHIO.

Endorsed and Specified by Leading Architects and Sanitary Engineers.

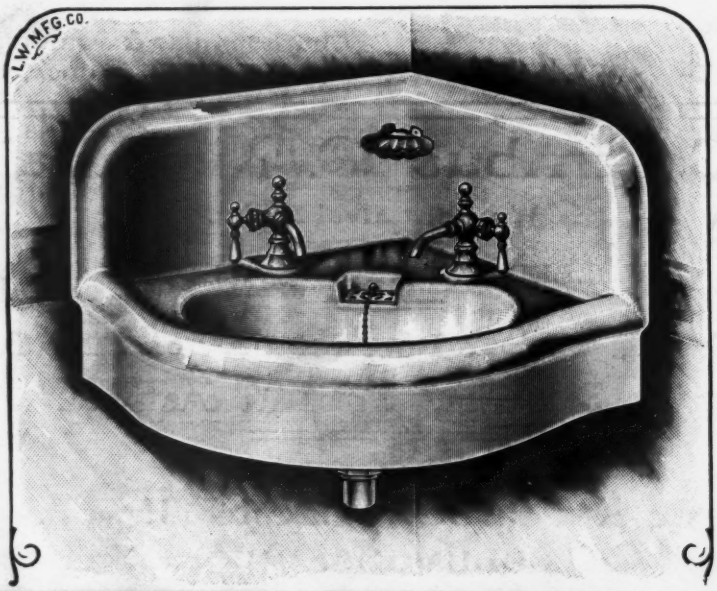
LOOMIS FILTERS
Established 1880

LOOMIS-MANNING FILTER CO.
402 Chestnut St., Philadelphia
Boston
New York
Baltimore
Washington

L. Wolff Mfg. Co.



F-2562.—(SLAB, APRON AND BACK IN ONE PIECE.)



F-2565.—(SLAB, BACK AND APRON CAST IN ONE PIECE.)

Our new and improved lavatories are shown herewith; the slab, aprons and back being cast in one piece; have large sanitary overflows with N. P. Brass Removable Strainers, therefore easy of access; the bowls are "Columbian" design.

A circular giving prices and dimensions of lavatories herewith illustrated and showing our entire line of Enameled Iron Lavatories is now being sent to the Plumbing Trade—if it has not reached you kindly advise us.

L. Wolff Mfg. Co.

CHICAGO

General Office: 93 W. Lake Street
Showrooms: 91 Dearborn Street

BRANCH: DENVER, COLO.

The only FILTERS that can thoroughly CLEANSE themselves.

LOOMIS FILTERS
Main Office, 402 Chestnut Street
Philadelphia, Pa.

For Residences, Hospitals, Hotels, Apartments, Office Buildings, Laundries, Mills, Etc.